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RIGHTS-OF-WAY

Construction Operation And Maintenance Plan

USDA
Forest Service
Utah National Forests
and
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Bureau of Land Management
Utah Districts

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CONSTRUCTION, OPERATION, AND MAINTENANCE PLAN

Guidelines and Sample Format and Content

Prepared by

USDA, Forest Service, Region Four
Utah National Forests

and

USDI, Bureau of Land Management
Utah State Office

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GUIDELINES AND SAMPLE FORMAT/CONTENT FOR PREPARATION AND USE OF A CONSTRUCTION, OPERATION, AND MAINTENANCE PLAN FOR MAJOR ELECTRICAL TRANSMISSION LINES AND GAS AND OIL PIPELINES ON FEDERAL LANDS

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CHAPTER I

INTRODUCTION

PURPOSE

The purpose of this manual is to aid Grant/Permit Holders in developing a Construction, Operation, and Maintenance Plan (herein called a COM Plan) for use on energy-related projects approved through the National Environmental Policy Act (NEPA) process. This manual provides a uniform procedure and outline for coordinated efforts between the U.S. Department of the Interior (USDI), Bureau of Land Management (BLM), Utah District Offices; the U.S. Department of Agriculture (USDA), Forest Service (FS), Utah National Forests; and the Grant/Permit Holders for developing a COM Plan.

OBJECTIVE

The objective of this manual is to develop and implement applicable provisions and mitigating measures agreed upon by the BLM, the FS, and other agencies during and after the NEPA process. These provisions and measures will be described in a coordinated working document and will constitute part of the Grant and/or Land Use Authorization.

IMPLEMENTATION

THE COM Plan will become part of the Grant and/or Land Use Authorization by stipulation.

This Plan will supplement the general and special provisions and measures required as part of the Grant and/or Land Use Authorization.

AUTHORITIES

As stated in Section 504(d) of the *Federal Land Policy and Management Act of 1976* (FLPMA):

The Secretary concerned, prior to granting or issuing a right-of-way pursuant to this title for a new project, which may have a significant impact on the environment, shall require the applicant to submit a plan of construction, operation, and land rehabilitation for such rights-of-way which shall comply with stipulations or with regulations issued by the Secretary, including the terms and conditions required under Section 505 of this Act.

As stated in 36 Code of Federal Regulations (CFR) 251.54(3):

The applicant's proposed measures and plans for the protection and rehabilitation of the environment during construction, operation, maintenance, and termination of the project shall be required.

As stated in 36 CFR 251.56(c):

Forest Service approval of location, design, and plans (or standards, if appropriate) of all developments within the authorized area will be required prior to construction.

CHAPTER II

KEY PHASES OF COM PLAN PROCESS

INTRODUCTION

The following information is a summary of key phases of the Construction, Operation, and Maintenance (COM) Plan process. Chapters III and IV and Appendix A provide detailed methodologies and procedures for each phase.

DEVELOPMENT OF COM PLAN

The COM Plan is developed after completion of the National Environmental Policy Act (NEPA) process and issuance of the Bureau of Land Management (BLM) right-of-way grant. The COM Plan must be completed and approved prior to issuance of BLM notices to proceed and Forest Service (FS) land use authorizations.

Land Survey and Data Gathering

Additional environmental analysis may be necessary for centerline location and site selection (i.e., land surveying) after an Environmental Analysis/Environmental Impact Statement (EA/EIS) has been prepared and a decision on corridor and/or site location has been made. However, additional NEPA documents are not needed for project work adequately addressed by an EA/EIS. (40 Code of Federal Regulations [CFR] 1502.20 provides for incorporation of an EA/EIS by reference where subsequent documents shall concentrate on issues specific to individual projects.)

The additional environmental studies or detailed field examinations required after the EA/EIS will:

1. Allow for interdisciplinary identification of site-specific environmental impacts and mitigation measures applicable to proposals of the holder.
2. Be completed by the responsible land management agencies (interdisciplinary teams) and company representatives of all project sites, access road locations, and other facilities needed for project implementation.
3. Be documented in agency reports.

These reports will itemize detailed provisions and mitigation measures for implementation at defined locations. (The report format is left to the discretion of the land management agency.)

These additional studies or examinations may result in changes in project facility locations and centerline alignments previously addressed by the EA/EIS or by company survey and design work completed during the NEPA process phase of the project proposal.

A temporary use permit for surveying the alignment may need to be issued. The following information is needed from the Grant/Permit Holder to determine if a permit will be needed and the restrictions to apply:

1. State clearing line width when surveying in tree-covered areas. (Normally the agencies will not grant clearing to exceed 3 feet in width.)
2. Type of access (locations of the following access requirements plotted on a map):
 - a. Travel areas for helicopters and, if constructed landing sites are required, locations for sites;
 - b. Existing roads; and
 - c. Cross-country travel routes (by foot and/or off-road vehicles [ORVs]) if no roads are used. Access preference for agencies are as listed above (i.e., helicopter, existing road, foot travel, ORVs).
3. Kind of survey markers to be used.
4. Length of time and number of crews required for field surveying. (Refer to Chapter III for a detailed discussion of the land survey methodologies and procedures needed to develop the COM Plan.)

The COM Plan will then be developed utilizing provisions, measures, and actions resulting from the above-discussed field procedures and follow-up reports.

Close coordination will be needed during development of the Plan. The Authorized Personnel from the agencies and the Grant/Permit Holder will be responsible for applying the results of field assessments to the development of the Plan.

DESCRIPTION OF COM PLAN

A recommended outline and examples of format and content for the COM Plan are included in Chapter 4 and Appendix A. The outline is summarized as follows:

CHAPTER II

Introduction, Background, and Construction Description

Prepared principally by the Grant/Permit Holder.

Designation and Responsibilities of Project Management

Prepared jointly by the agency and Grant/Permit Holder.

Site-Specific Practices and Mitigation Measures

Prepared jointly by the agency and Grant/Permit Holder. This section describes how natural resources and related values and uses will be

managed during the construction phase of the project.

To assist in developing these practices and measures, examples of 14 subsections are included in Appendix A. Some projects will not require all 14 subsections nor the level of detail included in the examples. The size and complexity of the project will determine the subsections needed and the level of detail required. Sections may be expanded, deleted, or modified to fit particular needs and conditions encountered on FS- or BLM-administered lands.

CHAPTER III

DATA GATHERING FOR COM PLAN

INTRODUCTION

This chapter discusses alignment, structure and road location, vegetative treatment (landscaping), road access, slash reduction, and operation and maintenance of the right-of-way for electrical transmission lines and pipelines. Information presented here is provided only to serve as a guide for the Grant/Permit Holder and the land manager when making decisions concerning the location and design of a utility.

The steps for development of a Construction, Operation, and Maintenance (COM) Plan are:

PRELIMINARY ALIGNMENT

The land manager should be involved in field locating points of intersects (PIs) since these sites dictate the general location of tower sites for electrical transmission lines and pipeline tangent locations. The preliminary alignment will be approved by the land manager.

STRUCTURE AND ROAD LOCATION REVIEW AND APPROVAL

These steps are discussed in detail below.

Alignment

Proper alignment reduces visual impact, erosion, vegetative losses, and improves vehicular access required for the project. Alignment should not be confused with corridor location. The alignment of the electrical transmission line or pipeline is within the corridor described in the Environmental Impact Statement (EIS) or Environmental Analysis (EA) and selected in the Record of Decision (ROD) or the Notice of Record/Decision Record. (Corridor studies, EISs or EAs, and RODs will not be discussed in this manual.)

The route for lines selected within the corridor should best meet the mitigation established during the National Environmental Policy Act (NEPA) process. This route is established during land surveys following the NEPA process.

Location should be a joint effort by the land management agency and the Grant/Permit Holder.

METHODS FOR SELECTING PIs

Suggested methods and considerations for establishing and locating PIs are as follows:

- *Ground Travel:* Travel the selected corridor before any PIs are located. Keep in mind any mitigation requirements in the ROD and in the Grant/Permit.
- *Fixed-Wing Flight:* This method gives an overall view of the selected corridor; however, this method should not be substituted for ground travel. Locate landforms, landmarks, etc. mentioned in the EIS/EA and identify these on aerial photographs. Also, take 35mm slides and a video tape of the proposed alignment.
- *Helicopter:* This is the best method to physically set PIs. This method enables a number of PIs to be set, and changes can be made rapidly. It is also possible to get an overview of an alignment up to 3 or 4 miles at one time. With use of a helicopter, changes can be made with limited ground travel.

VISUAL REFERENCE SYSTEM FOR IDENTIFYING PIs AND ALIGNMENT

To readily identify PIs and alignment of the line, a visual reference system can be used. This system can confirm blending characteristics. The following methods can aid in identifying the proposed alignment.

- *Helium-Filled Balloons:* These give a visual reference to PI locations and structure heights. Balloons should be tethered at the PIs and floated to the same height as the proposed transmission line structures. For locating pipeline PIs, the balloons should be floated to about 100 feet, depending on the height of the tree cover.
- *Video Taping:* Taping is used in connection with balloons. This can be done in most places and is especially effective in critical and sensitive areas.
- *Thirty-Five mm Camera:* Color photographs of selected areas of the alignment and PI locations are taken. Photographs serve as an aid when locating PIs in sensitive areas.
- *Photograph Rendering (Photographic Simulation):* Oblique color slides of sensitive areas are taken from an aircraft before PIs are placed.

CHAPTER III

The image of the photograph is projected onto paper, and the proposed alignment, structure locations (for transmission lines), and landscaping are drawn. This method requires a month's lead time and requires going back in the field to establish the PIs as sketched from the renderings. Although this is an expensive and time-consuming method, it does portray the actual situation.

- *Computer Simulation:* This method requires use of a Hewlett Packard 9000 Series T Desktop Computer, plus peripheral devices or a similar-type computer hardware. The computer predicts the appearance of a proposed project, or portions of the project, and tests desirability of alternative designs. The computer can accurately simulate terrain and vegetative cover. With this method, an alignment and structure shapes (for transmission lines) can be placed in the landscape and a design of the vegetative cover and structures for the right-of-way can be displayed. Alignment and vegetative design can be manipulated by the computer to achieve the best possible combinations.

Additional Considerations for Selecting PIs and Alignment

The preceding sections described alternative methods for locating PIs and alignment within a corridor. However, before placing PIs, certain items must be considered. These are discussed below.

VEGETATIVE COVER

Vegetation or the lack of it is an important factor to consider when determining PIs. Heavy tree cover, as compared to open parks, light tree cover, and low-growing bushes requires different approaches when placing a line.

Table 1 shows capabilities of various tree species for blending with electrical transmission lines. (This table does not apply to pipeline rights-of-way, which require removing most, if not all, of the vegetative cover.) Table data assume complete tree cover with no openings, meadows, creeks, etc. Openings, meadows, and other changes in vegetative patterns and types could improve the blending capabilities.

Information from this table could be used to develop a Forest Service (FS) visual absorption capability (VAC) or a Bureau of Land Management (BLM) visual rating system for a particular

TABLE 1
BLENDING CAPABILITY FOR
VARIOUS TREE SPECIES
(ELECTRICAL TRANSMISSION LINES)

Tree Type	Stand Type	Blending Capability
Lodge Pole		
Mature to over-mature	Even age	Most difficult. Creates slot effect. -Screening good to moderate. -Topping of over-mature trees is difficult.
Sapling to pole	Even age	Most difficult. Possible to span portions of stands, but slot effect is likely. -Screening good to moderate -Results from topping of trees are good to moderate.
Aspen		
Mature to over-mature	Even age	Difficult. However, reproduction is rapid and will reduce slot effect in a few years. -Screening poor to good. -Results from topping of trees are poor.
Sapling to pole	Even age	Moderate. Possible to span portions of stands; however, growth rate must be considered for later cutting of mature trees under conductors. -Screening difficult. -Results from topping trees are poor.
Spruce-Fir		
Over-mature	Uneven age	Good to excellent. Young growth in the stand reduces possible slot effect. -Screening excellent. -Results from topping very good.
Mature	Even age	Good to moderate. Mature trees with a mix of young growth means less chance for slot effect. -Screening excellent. -Results from topping very good.
Spruce-Fir		
Sapling to pole	Uneven age	Good to moderate. Limit slot effect. -Screening excellent after 10 years. -Results of topping good.
Douglas fir		
Mature to over-mature	Even age	Good to moderate. Less slot effect. -Screening good. -Results of topping good.
Ponderosa Pine		
Age varies. Normally mature to over-mature trees are in groups with sapling to pole as understory	Even age in groups with uneven age in understory	Good to excellent. Mature to over-mature trees can be removed without creating slot effect. -Screening poor to good. -Results of topping good.

CHAPTER III

**TABLE 1 (cont.)
BLENDING CAPABILITY FOR
VARIOUS TREE SPECIES
(ELECTRICAL TRANSMISSION LINES)**

Tree Type	Stand Type	Blending Capability
Pinyon and Juniper Mature to over-mature and sapling to pole	Even age	Excellent. Can span trees in most cases. Clear only at structure site. -Screening poor. -Topping not necessary.

area by adding slope, variety, vegetative regeneration potential, and soil characteristics. The VAC rating for the particular area would consider observer position, aspect, view duration, and occurrence.

TERRAIN

Terrain probably presents the best opportunities for blending a line. For successful blending, follow these guidelines:

- Locate the line in conformance with prevalent direction or patterns of topographic features. Avoid crossing hills at right angles to the contours or with the alignment centered on the hill crest. Run the line near the base of hills and use hills as a screen.
- Locate the line along edges of valleys.
- Cross highways at right angles or so the alignment is not outlined against the sky.
- Curve the line to blend with the topography in hills and mountains.
- Cross timbered hills obliquely rather than at right angles to the contours.
- Locate the line along edges of land patterns to avoid dividing land patterns.

ACCESS

For electrical transmission projects, access should be available at about 2,000- to 10,000-foot intervals at a minimum. This distance could be extended, depending on terrain, vegetation, availability of access roads, and conductor size. (Conductor size will influence the number of pull and tension sites.)

For pipeline projects, access should be available to key entry and exit points along the right-of-way. Such points will be those at the beginning and ending of steep terrain where vehicle access within and along the pipeline right-of-way itself is constrained or prohibitive or where key points are needed for delivery of pipe and other materials.

Access can cause more visual impact than the right-of-way clearing and transmission structures.

Construction access can be by ground vehicle, helicopter, or a combination of ground and helicopter use.

For ground vehicle access to the right-of-way, the following items must be identified:

- New roads to be constructed, including: (1) permanent roads retained for public use upon completion of the project; (2) permanent roads retained for use by the right-of-way holder for maintenance purposes; and (3) temporary roads to be closed upon completion of the project.
- Existing roads to be reconstructed, including: (1) permanent roads retained for public use; and (2) temporary roads closed upon completion of the project.
- Existing (permanent) roads to be used with only minor maintenance.
- Routes where overland travel will be allowed, with either no or minor blading of ground cover.

The requirements for road location and design are shown in Table 2. This table explains road standards for electrical transmission line right-of-way sites (i.e., tower sites, pull sites, tension sites, staging areas, storage areas) and pipeline project access to areas outside the pipeline right-of-way and above-ground facilities within the pipeline right-of-way (i.e., staging areas, storage areas, double-jointing yards, block valves, compressor stations, maintenance bases, and meter stations).

A roadway is needed within and along pipeline rights-of-way for various construction operations (i.e., ditching of trench, stringing of pipe, bending operations, welding phases, placing pipe in trench). Actual roadway width will vary from 18 to 40 feet in width, depending on size of pipe and percent of sideslope.

On flat or gently rolling terrain, the roadway width can be held to a minimum (i.e., only that required for size of equipment and size of pipeline). On steeper terrain the roadway width will increase, as shown in Figures 1 through 4.

Sidehill cuts on slopes greater than 50 percent will be bladed out only enough to ensure a safe and stable plane for equipment.

Side-cast soils must not extend beyond right-of-way width. As the percent of sideslope increases, the toe of fills should extend closer to the downhill right-of-way boundary.

A split-level or two-toning sidehill construction method should be used where side-casting of

CHAPTER III

TABLE 2
Requirements for Road Location and Design¹
Permanent Public Roads²

<hr/> Location <hr/> <ul style="list-style-type: none">• Do not locate down the middle of the electrical transmission line ROW; locate on the edge of ROW. Where possible, locate on side hills, not in bottom of drainages.• Where possible, blend into edge of clearing, meadows and follow the general contour and profile of the land. <hr/>	<ul style="list-style-type: none">• Provide downspouts that extend to the natural ground for culverts that end part way up a fill slope.• Install culverts with proper bedding and compaction.• Place culvert inlet a minimum of 5 feet from the shoulder. <hr/>
<hr/> Grade <hr/> <ul style="list-style-type: none">• Maximum sustained grade should not exceed 7%.• Pitch grades should not exceed 10%, unless permitted and then only for a maximum distance of 300 feet, unless cross drains are piped. <hr/>	<hr/> Road Section <hr/> <ul style="list-style-type: none">• Have at least 14 feet of finished running surface.• Place gravel surface on all roads with unstable natural surfaces, such as silty sand or clay.• Increase road width on each side of running surface, if running surface is graveled.• Place a minimum of 6 inches of crushed gravel when surfacing is required. <hr/>
<hr/> Backslope <hr/> <ul style="list-style-type: none">• No steeper than 1 1/2: 1, except for rockfills which may be 1 1/4:1.• Do not push into streams or drainages with intermittent flow.• Use special design where 1 1/2:1 fill slopes will not intercept natural ground. <hr/>	<hr/> Borrow Pits <hr/> <ul style="list-style-type: none">• Show locations in COM Plan. <hr/>
<hr/> Drainage <hr/> <ul style="list-style-type: none">• Cross live streams with permanent structures.• Use suitable permanent structures of intermittent drainages.• Culvert spacing in accordance with approved design.• In fill sections, extend culverts from toe to toe of fill.• Provide ditching for all cut sections; through cuts will require ditching on both sides.• In cuts, transition the backslope towards the inlet 20 feet each side of the culvert.• Cover culvert with at least one foot of fill at the inlet shoulder.	<hr/> Turnouts <hr/> <ul style="list-style-type: none">• Construct as intervisible and/or spaced no farther than 1,000 feet.• Construct as 10 feet wide, 100 feet long, with a minimum transition of 50 feet. <hr/> Curves <hr/> <ul style="list-style-type: none">• Provide a minimum radius of 80 feet.• Establish grades on switchbacks at no steeper than 4%.

CHAPTER III

TABLE 2

Requirements for Road Location and Design¹

Permanent Public Roads² (Continued)

Clearings

- Do in advance of construction.
- Set 6 feet from the shoulder or to the toe of the fill as minimum clearing for fill slopes, whichever distance is greater.
- Clear 2 feet outside the intersection of the cut slope with the natural ground surface.
- Within roadways, grub all stumps, roots, and other wood larger than 3 inches in diameter, except undisturbed stumps are to be left in place where the embankment is more than 3 feet in height, provided the stumps do not extend more than 2 feet to subgrade or 1 foot to slope surface and do not interfere with placement or compaction of embankment.
- Cut stumps and roots flush with the ground in lieu of removal in areas staked for clearing and grubbing beyond the road prism slope line and on slope surfaces.

Placing Embankment

- Keep excavated material from escaping beyond embankment toe.
- Place suitable excavation in layers no more than 12 inches thick; if excavated rock is more than 8 inches in diameter, layer to thickness needed to accommodate material involved, but no layer shall exceed 24 inches before compaction.
- Compaction will be controlled for sections that are to receive gravel.
- Place embankment in horizontal layers not exceeding 8 inches (loose measure) and compacted.
- Maintain moisture content suitable for required compaction.
- Compact embankment and top 1 foot of excavation section to at least 95% of maximum density as determined by AASHTO T-99, Method C or D.
- Where density cannot be tested on rock embankments, compact embankment by working smaller rocks to fill the voids and operating equipment over full width of embankment materials.

- Layer all embankments except over rock surfaces; on these surfaces, place material by end-dumping to a minimum depth needed for operation of spreading equipment.
- Level and smooth each embankment prior to placement of additional material.
- Operate the hauling and spreading equipment over the full width of each layer.
- Rocks and boulders can be placed in embankment if allowed. They would be distributed with voids filled with finer material to form a dense compact mass.
- On swampy ground (when removal of material is not required) layer the lower part of the fill to the minimum depth necessary to support hauling equipment.
- If material containing a large amount of rock is used to construct embankments, obtain a solid fill by working smaller pieces in with larger rocks and fines to fill the remaining voids, and by operating hauling and spreading equipment over full width of each layer as full is constructed.
- Compact all fills, except rock, to 95% maximum density, as determined by the proctor method.

Fences

- Install cattleguards in fences.
- Minimum width for cattleguards is 14 feet.

Revegetation

- Do revegetation, fertiliation, and mulching on all cut and fill slopes that are favorable to revegetation.
- Do seeding and planting as directed.

CHAPTER III

TABLE 2

Requirements for Road Location and Design¹

Permanent Public Roads² (Continued)

Plans and Specifications
<ul style="list-style-type: none">• Submit complete set of plans and specifications to agencies with the COM Plan.• Do not commence clearing or construction until plans and specifications are returned with written approval from the agencies.

¹ Location and construction standards will be approved in writing and shown on the COM Plan.

² To be retained for public use.

CHAPTER III

TABLE 2
Requirements for Road Location and Design¹
Permanent Access Roads³ (Continued)

Location	Drainage
<ul style="list-style-type: none">• Do not locate down the middle of the electrical transmission line ROW; locate on edge of ROW. Where possible, locate on side hills, not in bottom of drainages.• Where possible, blend into edge of clearing, meadows and follow the general contour and profile of the land.	<ul style="list-style-type: none">• Cross live and intermittent drainages using suitable permanent structures such as bridge, culvert, concrete ford, or rock-faced stream bottom.• Provide ditching for all cut sections, and provide for ditching on both sides for through cuts.• Use water bars for cross road drainage where needed, and space no greater than 300 feet.
Grade	Road Section
<ul style="list-style-type: none">• Maximum sustained grade should not exceed 8%.• Pitch grades should not exceed 12%, unless permitted and then only for a maximum distance of 300 feet.	<ul style="list-style-type: none">• Have at least 10 feet and no more than 12 feet of running surface.• Out slope at least 4%.• Gravel unstable natural surfaces such as silty sand or clay for all weather access; add 2 feet of roadbed width on each side of running surface if graveled.
Backslope	Turnouts
<ul style="list-style-type: none">• No steeper than 1 1/2:1 in common excavation.• In rocky materials, can be 3/4:1 or steeper if rock is solid.	<ul style="list-style-type: none">• Not required unless needed for maintenance of transmission line.• If needed, construct as 10 feet long, with a minimum transition of 50 feet.
Fill Slope	Curves
<ul style="list-style-type: none">• No steeper than 1 1/2:1 except for rockfills which may be 1 1/4:1.• Do not push into streams or drainages with intermittent flow.• Use special design where 1 1/2:1 fill slopes will not intercept natural ground.• Compact all fills.	<ul style="list-style-type: none">• Provide a minimum radius of 60 feet.• Establish grades on switchbacks at not steeper than 6%.

CHAPTER III

TABLE 2

Requirements for Road Location and Design¹

Permanent Access Roads³ (Continued)

<hr/> Clearings <hr/> <ul style="list-style-type: none">• Do in advance of construction.• Limited to actual road prism and that needed for safety of travel.• Clearing to be approved in writing after review on ground.• Within roadways, grub all stumps, roots, and other wood material larger than 3 inches in diameter, except undisturbed stumps are to be left in place where the embankment is more than 3 feet in height, provided the stumps do not extend more than 8 inches above the original ground and the stumps do not extend closure more than 2 feet to subgrade or do not interfere with placement or compaction of embankment. <hr/>	<ul style="list-style-type: none">• If material containing a large amount of rock is used to construct embankments, obtain a solid fill by working smaller pieces in with larger rocks and fines to fill the remaining voids, and by operating hauling and spreading equipment over full width of each layer as fill is constructed. <hr/>
<hr/> Placing Embankment <hr/> <ul style="list-style-type: none">• Keep excavated material from escaping beyond embankment toe.• Place suitable excavation in layers no more than 12 inches thick; if excavated rock is more than 8 inches in diameter, layer to thickness needed to accommodate material involved, but no layer shall exceed 24 inches before compaction.• Layer place all embankments except over rock surfaces where may be placed by end-dumping to a minimum depth needed for operation of spreading equipment.• Level and smooth each layer prior to placement of subsequent material.• Operate hauling and spreading equipment over full width of each layer.• Rocks and boulders can be placed in embankment if allowed. They would be disturbed with voids filled with finer material to form a dense compact mass.• On swampy ground (when removal of material is not required) layer the lower part of the fill to the minimum depth necessary to support hauling equipment. <hr/>	<hr/> Fences <hr/> <ul style="list-style-type: none">• Install gates or other suitable livestock control devices in all fences crossed. <hr/>
<hr/> Revegetation <hr/> <ul style="list-style-type: none">• Revegetate and install suitable drainage structures immediately after road is no longer needed for line construction purposes.• Revegetate, mulch, and fertilize on all cut and/or fill slopes and the road prism, including the road surface, on areas favorable for revegetation.• Seed and plant as directed in the COM Plan. <hr/>	<hr/> Plans and Specifications <hr/> <ul style="list-style-type: none">• Submit complete set of plans and specifications to agencies with the COM Plan.• Do not commence clearing or construction until plans and specifications are returned with written approval from the agencies. <hr/>

¹ Location and construction standards will be approved in writing and shown in the COM Plan.

³ To be retained for maintenance purposes for Holder's use only.

CHAPTER III

TABLE 2

Requirements for Road Location and Design¹

Temporary Roads⁴

Location	Road Section
<ul style="list-style-type: none">Follow the general contour and profile of the land, creating redundant soil disturbance possible. Where possible, locate on side hills, not in bottom of drainages.Do not locate in drainage bottoms.	<ul style="list-style-type: none">Have no less than 10 feet or more than 12 feet of running surface.
Requirement Grade	Time Limit
<ul style="list-style-type: none">Keep to an absolute minimum.Maximum sustained grade on spur roads is 10%.Pitch grades will not exceed 15% unless permitted and then only for a distance of 500 feet.	<ul style="list-style-type: none">Will obliterate temporary road when work in that area has been completed, or as directed by the Designated Officer.
Backslope	Curves
<ul style="list-style-type: none">All cut sections will be vertical.	<ul style="list-style-type: none">Provide a minimum radius of 45 feet.Establish grades on switchbacks at not steeper than 7%.
Fill Slope	Clearings
<ul style="list-style-type: none">No steeper than natural angle of repose.	<ul style="list-style-type: none">Do in advance of construction.Limited to actual road prism and that needed for travel safety.Approved in writing after on-the-ground review.Do not damage or disturb soil, ground vegetation, or trees outside the vertical backslope or road prism.
Drainage	
<ul style="list-style-type: none">Use water bars or other suitable type erosion control for cross drainage.Space water bars no greater than 300 feet apart.Out slope all road surfaces.Show types of drainage structures used to cross live and intermittent drainages in the COM Plan. Drainage, where needed, and space no greater than 300 feet.	

CHAPTER III

TABLE 2

Requirements for Road Location and Design¹

Temporary Roads⁴ (Continued)

<hr/> Earthwork <hr/> <ul style="list-style-type: none">• Utilize suitable excavated material as back-fill or embankment.• Borrow areas will require prior approval.• Keep excavated material from escaping beyond embankment toe.• Can place embankment by side-casting and end-dumping.• On swampy ground (when removal of material is not required) layer the lower part of the fill to the minimum depth necessary to support hauling equipment.• If material contains a large amount of rock and is used to construct embankments, obtain a solid fill by working smaller pieces in with larger rocks and fill the remaining voids. <hr/>	<ul style="list-style-type: none">• Use water bars or other suitable type structures where needed to adequately control runoff and prevent soil loss. Show location of these structures in COM Plan. Remove all culverts. <hr/>
<hr/> Fences <hr/> <ul style="list-style-type: none">• Install gates or other suitable livestock control devices in fences crossed. <hr/>	<hr/> Winterization <hr/> <ul style="list-style-type: none">• During construction, reshape temporary roads, remove berms and reshape water bars before October 1 for area above 9,000 feet in elevations below 9,000 feet.• After winterization place barriers across temporary roads. <hr/>
<hr/> Revegetation and Restoration <hr/> <ul style="list-style-type: none">• Obliterate and restore to natural contour as far as possible.• Install revegetation and suitable drainage structures immediately after roads are no longer needed for line construction purposes. Obliterated is defined as follows: Slough off vertical cut into the roadbed and pull the berm fill or waste material on the downslope into the roadbed. After the material is pulled back into the roadbed, compact the material to form a good seed bed. Revegetate the area and install suitable drainage structures to prevent further loos of soil.• Revegetate all obliterated sections of the road. Determine the type and amount of vegetation species and need for mulch and fertilization. Revegetation may include forbs, grasses, and tree species. Check revegetation for the first year and reseed all areas where vegetation has failed.	<p>¹ Location and construction standards will be approved in writing and shown on the COM Plan.</p> <p>⁴ To be closed and revegetated/restored after construction is completed.</p>

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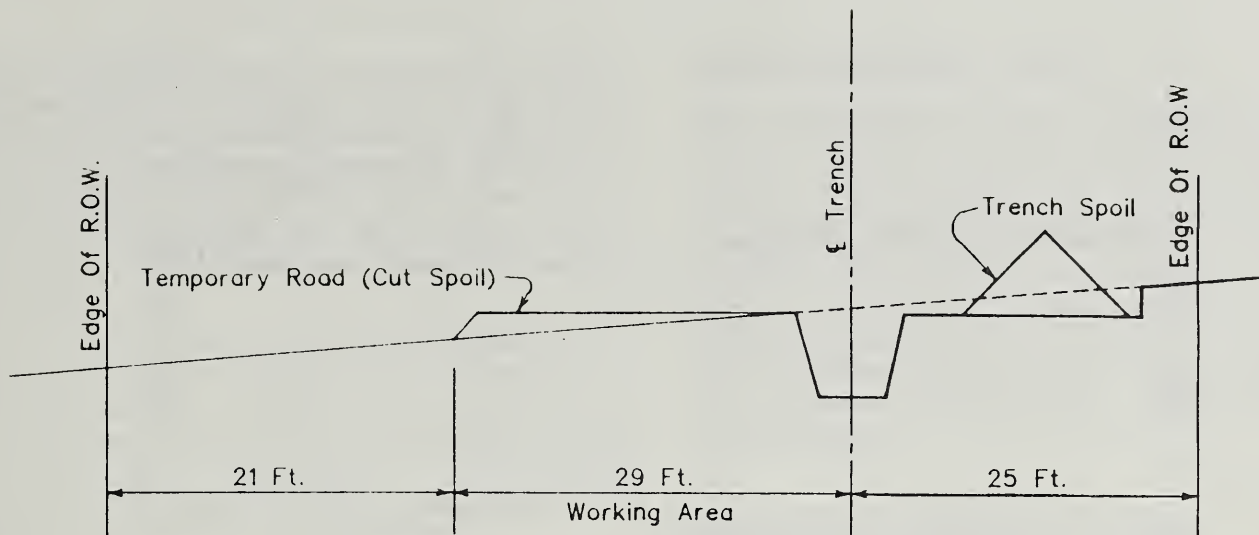


FIGURE 1
Right-of-Way Configuration for Pipeline Project
(10-Percent Slope)

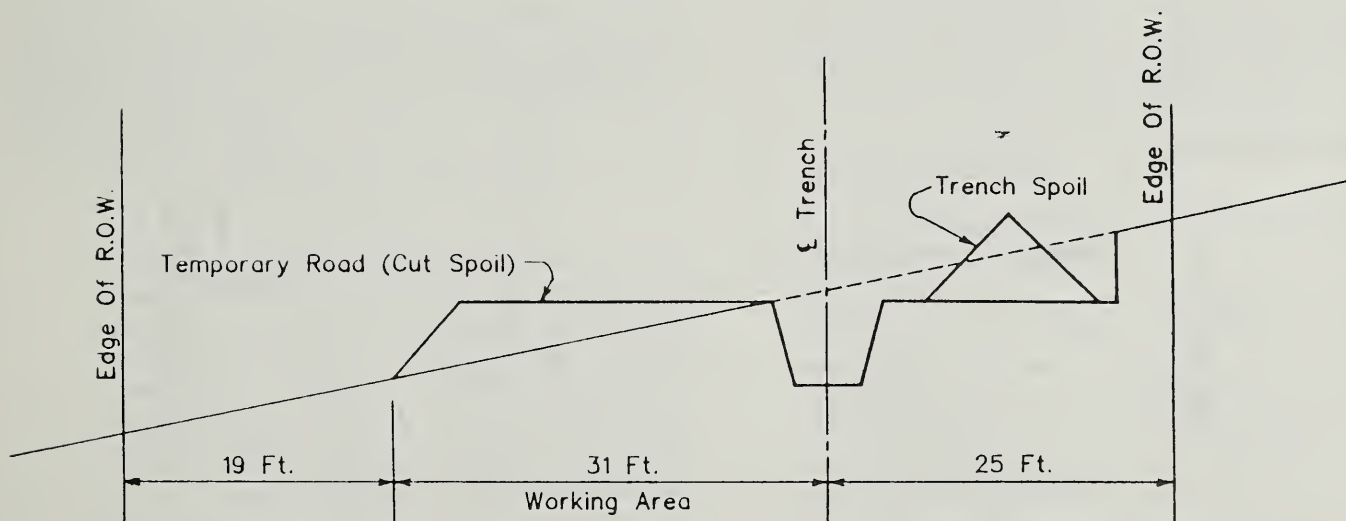


FIGURE 2
Right-of-Way Configuration for Pipeline Project
(20-Percent Slope)

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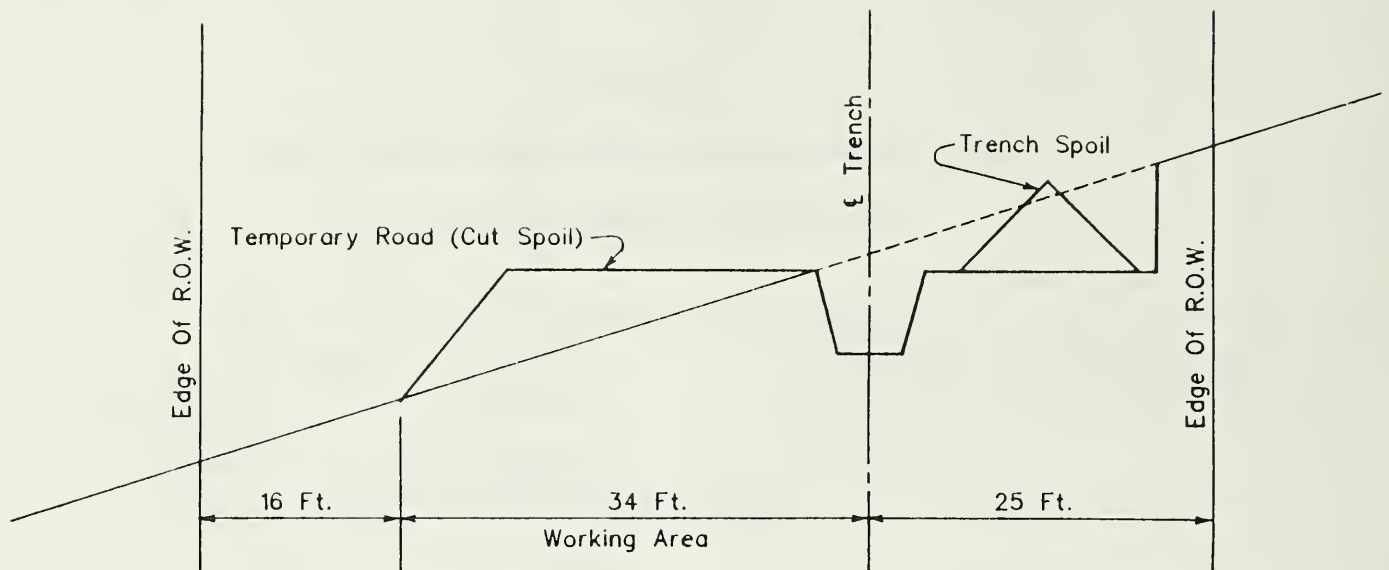


FIGURE 3
Right-of-Way Configuration for Pipeline Project
(30-Percent Slope)

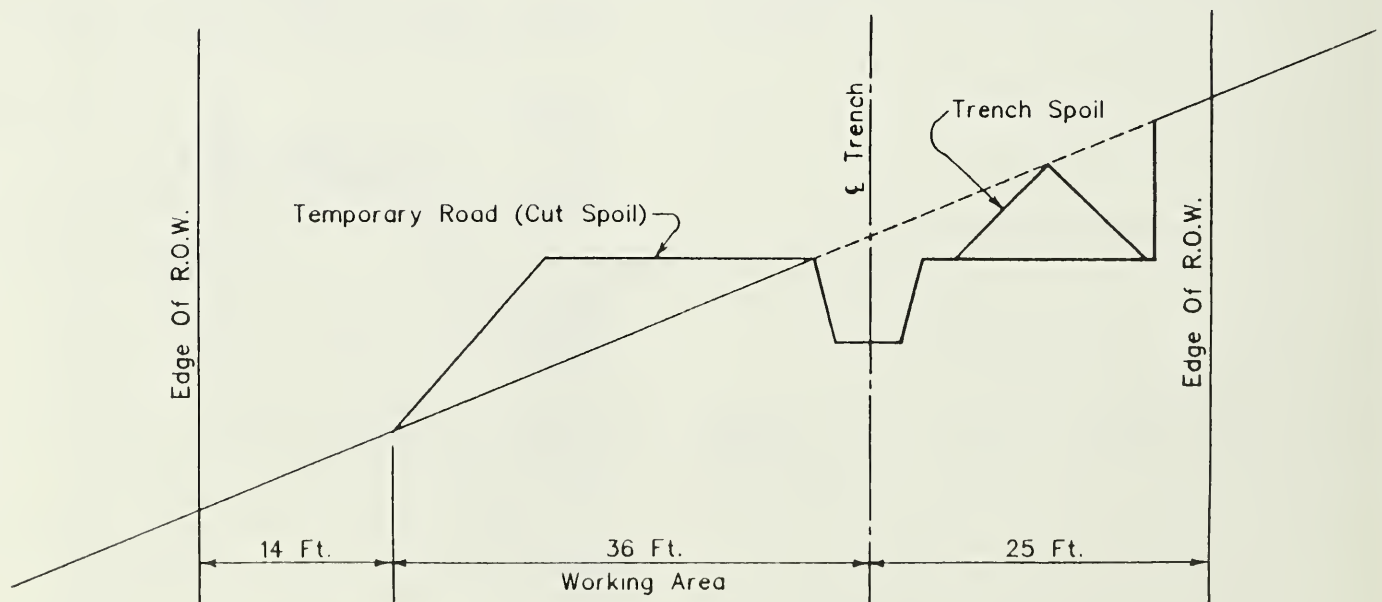


FIGURE 4
Right-of-Way Configuration for Pipeline Project
(40-Percent Slope)

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soils would extend beyond the established right-of-way width. Two step-like work planes should be used to move equipment, bring up additional pipe, and provide a trench and a pipe fabrication/holding area. Pipe is usually laid from the same side for the length of spread. If necessary, equipment can be moved to the opposite side of trench to lay pipe.

Cut and fill provides a portion of level work plane for construction equipment. The remaining excavated material is stored on the construction right-of-way downhill from work planes or hauled to an approved storage site. The down-slope storage area, consisting of mounded windrow of material, should not be graded level.

Excavated material is used to fill the two-toning cuts, following pipe fabrication and lowering of pipe into the trench. The sidehill should be restored to as near original contour as possible.

AIR ROUTES

The alignment should meet regulations for high structures, air fields, canyons, flight paths, etc. See Department of Transportation, Federal Aviation Administration (FAA) Advisory Circular 70/7460-1, entitled *Obstruction Marking and Lighting* for general requirements in obstruction marking and lights.

According to Code of Federal Regulations (CFR) standards (Part 77.23 of 14 CFR 77), an existing object would be an obstruction to air navigation if it is of greater height than any of the following heights or surfaces:

- A height of 500 feet above ground level at site of object.
- A height of 200 feet above ground level or above established airport elevation, whichever is higher, within 3 nautical miles of an established reference point of an airport (excluding heliports), with its longest runway more than 3,200 feet in actual length. That height increases in proportion of 100 feet for each additional nautical mile of distance from the airport up to a maximum of 500 feet.

For alignment of electrical transmission lines, questionable items such as high canyon crossings, locations near airfields, etc., should have a FAA aeronautical study. This study would determine if markings and/or lighting would be needed on the transmission line and structures for safety to air navigation. This study, to be done by FAA, would be initiated by the Grant/Permit Holder.

OTHER CONSIDERATIONS

Many other items should be considered in selection and design of the alignment, such as: (1) land formations like cliffs and large rock outcrops which may aid in the blending of electrical transmission lines or serve as obstacles to the locations of pipelines; (2) unstable land areas; (3) parks and natural openings; (4) sensitive wildlife areas; (5) sensitive stream/river crossings; (6) visual resource values; (7) cultural resource values; and (8) threatened and endangered (T&E) plant and animal species.

STRUCTURE AND ROAD LOCATION

The following steps should be taken before establishing a structure or road location. (Land management agency participation is essential when completing Steps 1, 3, 5, and 7.)

1. Review the alignment after PIs have been set.
2. Develop plan and profile. Determine the following: (1) the kind of access needed to structure sites and key points along the right-of-way; (2) changes in right-of-way widths, according to values involved; and (3) impacts to resource values from construction activities at structure sites, road access locations, and right-of-way clearing and grading operations.
3. Spot tower structures/pipeline locations on plan and profile.
4. Use survey crews to flag tower locations/pipeline locations in field.
5. Conduct an engineering review of tower site and pipeline locations to ensure proper locations. The land manager and company engineers should perform site prescription work at this time. (To assist in alignment and structure review, forms have been developed [see Appendix A, Section 13].)
6. Establish mitigation measures from project EA/EIS and agency land use plans; determine if these measures can be met by the alignment. If mitigation measures cannot be met for electrical transmission lines, move site structures along the alignment or establish new PI locations to meet objectives of mitigation measures. If mitigation measures cannot be met for pipelines, establish new PI locations with corresponding changes in alignment.

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7. Conduct an engineering review of road access locations and/or helicopter access.

After these steps are completed the holder can: (1) award tower/pipe fabrication contract, based on estimated quantities; (2) generate construction lists (i.e., tower heights and type of structure

[tangent vs. angle], special pipe lengths and prefabricated pipe bends, etc.); and (3) develop final material specifications (determine final quantities needed and finalize fabrication contracts).

With structure sites and alignment approved, the COM Plan can then be written.

CHAPTER IV

FORMAT AND REQUIREMENTS

FOR WRITING A COM PLAN

This section discusses, in outline form, the format and requirements for writing a Construction, Operation, and Maintenance (COM) Plan.

INTRODUCTION

Briefly indicate purpose and need of proposed facilities and describe each segment of right-of-way that crosses Federal lands.

BACKGROUND

Describe major issues and mitigation for compatibility with Federal management plans. (DO NOT REPRINT THE ENVIRONMENTAL ANALYSIS (EA).)

CONSTRUCTION

Project Description

Describe and/or illustrate project route, location, length, width, other rights-of-way crossed or paralleled, construction schedule, maps, and other items that may be pertinent to the project.

PROPOSED CONSTRUCTION

Describe facilities.

CONSTRUCTION SCHEDULE

Provide start-up and completion dates and schedule of work for all facilities and activities.

ACCESS

Discuss access needs, including road standards required for the project facilities. Show on plan, profile, and other maps the location of the following access requirements: (1) roads to be constructed; (2) existing roads requiring major reconstruction; (3) existing roads requiring only minor reconstruction; (4) existing roads requiring no reconstruction (indicate if existing and/or new roads will be needed for construction phase only or for both construction and long-term maintenance purposes); and (5) overland travel (i.e., travel over land without existing or constructed road access).

For the above access requirements, show the location and size of the following: (1) rock cross-

ing; (2) culverts; (3) bridges; (4) concrete crossings; (5) water bars; (6) any other types of constructed stream crossings.

With the above information, the Federal land management agencies will determine which roads will be: (1) retained for public use; (2) retained for use by only the right-of-way holder; (3) closed after the construction phase; and (4) where overland travel will be permitted.

Refer to Chapter III, Table 2 for detailed information on access requirements

EXCAVATION AND CLEARING

1. Show proposed excavation for construction of facilities.
 - Identify clearing widths by right-of-way mileposts.
 - Identify methods and locations of top soil storage and disposal of excess material and waste materials.
 - Discuss equipment staging areas.
2. Discuss vegetative types and clearing methods.
- Display the vegetative type and clearing pattern on a map for: (1) grasses and forbs (no breakdown of plant species is needed); (2) shrubs (species need not be identified); and (3) trees (identify species, such as pinyon-juniper, Ponderosa pine, lodgepole pine, spruce-fir, aspen, etc.). Also, give height, diameter, crown density, and trees per acre in the areas to be treated.
3. Show in plan view the following types of cutting treatments and cutting type areas:
 - Selective topping of trees.
 - Selective tree removal (percent removal).
 - Complete removal of trees (clear-cutting).
 - Partial removal of ground vegetation (percent removal).
 - Complete removal of ground vegetation.
 - Ground cover that will be disturbed but not removed during operations within the right-of-way.
4. Show on a map, in cross section, the distance from conductor or pipeline to vegetative clearance.

CHAPTER IV

5. Show on a map in plan view the location of skid trails, log decks, landings, wood chipping, lop and scatter slash, slash burning, and firewood decks.

HAULING OF EQUIPMENT AND CONSTRUCTION MATERIAL

- Identify sources for construction material such as sand and gravel.
- Show the location and size of borrow areas.
- Indicate methods of transportation to the site.

FACILITIES/STRUCTURES/SITES

- For electrical transmission lines, submit a plan view of the centerline of the structures and all phases of the electrical conductors. For pipelines, submit a plan view of the centerline of the pipeline trench.
- Show the location, number and size of the following: (1) structure sites; (2) crane pads; (3) pull sites; (4) concrete batch plants; (5) assembly sites; (6) storage yards; (7) double-jointing yards; (8) block valves; (9) compressor stations; (10) metering stations; (11) crew camp sites; (12) maintenance bases; (13) microwave sites; (14) cathodic protection sites; and (15) other sites.
- Show type, number, and size of: (1) *Towers*: design style, such as free-standing lattice-steel, aluminum, etc.; guyed lattice—delta, H-frame, etc.; wooden—H-frame, three pole; single pole—wood, steel, fiberglass, etc., angle; dead end; and suspension; (2) *Footings*: concrete—pads, direct burial, etc.; metal grillage; (3) *Equipment*: tracked and wheeled vehicles, welders, air compressors, concrete trucks, hydro-axe, chippers, cranes, trucks with trailers, helicopters, backhoes, slide-boom tractors, trenchers, and others; (4) *Insulators*: type—glass, porcelain, fiberglass, and others; and (5) *Pipe*: type and size.
- Discuss agency requirement for dulling shiny metals to a certain percent reflectivity. (Refer to Appendix H.) Each project will be evaluated on an individual basis for dulling, based on the Munsel color reflectivity chart. All materials for towers (steel, aluminum), conductors, guy wires, hardware, overhead groundwire, pump stations, fences, and any other shiny materials will be dulled.

- Show compressor stations, metering stations, maintenance bases, cathodic protection sites, microwave sites, and electrical requirements for these facilities.
- Briefly discuss construction procedures for the following: (1) tower framing and erection (powerlines); (2) stringing and sagging (powerlines); (3) clipping (powerlines); and (4) trenching, stringing, bending, lowering in and tie-ins, as-built survey, pad and backfill, hydrostatic testing and final tie-in (pipelines).

MAINTENANCE

- Provide names of persons to contact: Grant/Permit Holder and Authorized Officer.
- Outline maintenance to be performed and schedule of maintenance work.

Designation and Responsibilities of Project Management Officers

1. Designate and discuss responsibilities of those involved in management of the project.
 - Land Management Agencies: (1) Authorized Officers; (2) Field Compliance/Monitoring Officers; and (3) Project Inspectors.
Grant/Permit Holder: (1) Design Engineer; (2) Site Construction Manager; and (3) Construction Inspectors.
2. Describe how contractor and government agencies will comply with all provisions of the COM Plan.
3. Discuss personnel interfaces.
4. Discuss preconstruction conference.
5. Indicate that requests for special use authorizations should be made at least 4 weeks before the following activities: (1) access roads; (2) borrow areas; (3) staging areas; (4) heliports; (5) construction camps; (6) batch plants; (7) parking lots; (8) additional construction areas outside of the grant or special use areas; and (9) other activities, if applicable.

Site-Specific Practices and Mitigation Measures

An agreement should be made by the Authorizing Officers and the Grant/Permit Holder as to whom

CHAPTER IV

has responsibility for each construction requirement of the project. (All of the following items are not necessarily required for each project.)

1. Wild fire protection.
2. Clearing and disposal, including implementation of visual resource provisions.
3. Erosion control, revegetation, and restoration measures.
4. Transportation.
5. Visual resources.
6. Flagging.
7. Communications.
8. Cultural resources.
9. Threatened and endangered (T&E) animal and plant studies and wildlife mitigation measures.
10. Blasting.
11. Health and safety.
 - a. Solid waste.
 - b. Oil spills.
 - c. Pesticides, herbicides, and other chemical controls.
 - d. Emergency response.
 - e. Traffic control.
 - f. Air quality.
12. Water quality.
13. Site prescriptions.

(See Appendix A for examples of site-specific

practices and mitigation measures. Each of the above 13 resource concerns are addressed in the examples.)

RIGHT-OF-WAY OPERATION AND MAINTENANCE

After construction is completed, maintenance and operation of the right-of-way will be carried out in accordance with a detailed working plan. This plan will consist primarily of:

1. Title and approval.
2. An introductory statement (short and concise giving general background of the plan).
3. A graphic section (maps).
4. A written section describing practices and responsibilities (include standards and guides). The written section will outline the following: (1) new or reconstruction activities and standards; (2) maintenance activities and standards; (3) right-of-way operations; (4) emergency procedures (down powerlines, broken pipelines, phone numbers of company and Federal land management personnel; and (5) objectives of the holder and the Federal land management agencies.

The Grant/Permit Holder will be responsible for preparation of the plan. The authorized officers will be responsible for providing technical assistance, approving the plan, and coordinating with other offices and agencies. (See Appendix B for an example of a Right-of-way Operation and Maintenance Plan.)

APPENDIX A

SAMPLE NARRATIVES FOR SITE-SPECIFIC PRACTICES AND MITIGATION MEASURES

INTRODUCTION

Measures presented in the following sections serve as examples. These measures could be included in a construction contract as written. If the original construction contract omits any necessary requirements they could be incorporated by change order into the contract. Following the Measures sections are exhibits containing information that could be included in the Construction, Operation, and Maintenance Plan.

GENERAL MEASURES

1. The Contractor will not conduct any activities within the transmission line/pipeline right-of-way prior to notification by the construc-

tion manager that either a Notice to Proceed or temporary use permit has been issued by the Bureau of Land Management (BLM) or the proper permits issued by the Forest Service (FS).

2. A list of cultural resource sites and threatened and endangered (T&E) plant and animal species in the vicinity of the right-of-way will be presented as exhibits to this COM Plan. These subjects are covered in Sections 8 and 9 of this Appendix. The ethnology of the area crossed by the project is also presented as an exhibit, with some discussion in Section 8. Due to the confidential nature of the information presented, the exhibits should have limited distribution.

The first part of the paper is devoted to a review of the literature on the effects of the 1997 Asian financial crisis on the real economy of the Asian countries. The second part of the paper is devoted to a review of the literature on the effects of the 1997 Asian financial crisis on the financial markets of the Asian countries. The third part of the paper is devoted to a review of the literature on the effects of the 1997 Asian financial crisis on the financial markets of the Asian countries.

Country	Year	GDP (US\$)
Japan	1997	47,000,000,000,000
South Korea	1997	20,000,000,000,000
Taiwan	1997	15,000,000,000,000
Hong Kong	1997	10,000,000,000,000
Singapore	1997	5,000,000,000,000
Malaysia	1997	4,000,000,000,000
Thailand	1997	3,000,000,000,000
Indonesia	1997	2,000,000,000,000
Philippines	1997	1,000,000,000,000
Vietnam	1997	500,000,000,000

Source: Asian Development Bank (2000).

APPENDIX A

SECTION 1: WILD FIRE PROTECTION

1.0 Purpose

To provide responsibilities for prevention, pre-suppression, and suppression of fires during the construction of the (name of project) and to define minimum requirements that shall be included in all construction contracts for precautions on wild fire protection.

2.0 Objective

To prevent project-related, man-caused, and machine-caused wild fires within the project area and to cause prompt, aggressive action for all wild fires within the project area.

3.0 Responsibility

The Contractor shall be responsible for and implement the following action plan commensurate to the extent needed.

3.1 Initiate and implement all fire control activities on the project until relieved by the Authorized Officer.

3.2 Comply with State, county, and Federal laws, ordinances, rules, and regulations which pertain to prevention, pre-suppression, and suppression of fire activities.

3.3 Appoint a Fire Control Representative

who shall accompany the Site Construction Manager and the Authorized Officer on fire inspections and take corrective action when notified that fire protection requirements are not in compliance.

3.4 Prepare to stop all construction activities or construction operations or to reduce operations which pose a fire hazard until appropriate safeguards are taken. When extreme fire danger is present and the Contractor receives notification from the Site Construction Manager, the Contractor shall discontinue all work or portions thereof as directed.

The Authorized Officer may direct the Site Construction Manager to discontinue work or portions thereof. These directions or directives shall be given to the Contractor, and the Contractor shall cause the directives to be carried out.

3.5 Immediately alert the available project crews and the Site Construction Manager when a fire occurs within the project area. The project tools, equipment, and manpower shall be sent immediately to control the fire. The Site Construction Manager shall be responsible for immediately notifying the Authorized Officer of the fire, its location, and what corrective action has been taken.

3.6 Notification of a fire shall be made in accordance with the following list. (This information is to be provided before construction is initiated.)

Name	Telephone Number	
	Day	Night
Site Construction Manager with Emergency Caches		
Authorized Officer		
BLM/FS Fire Dispatch		
BLM Area Office		
Fire Dispatch		
BLM District Office		
Fire Dispatch		
Authorized Officer		
Forest Supervisor's Office		
Fire Dispatch		
Contractor's Fire Control Representative		

APPENDIX A

4.0 Notification

The Site Construction Manager will designate a field representative who will be responsible for notifying the Authorized Officer. Written notification will be made by the Site Construction Manager.

The Contractor shall also designate a fire control representative whose duties will be incorporated in the construction contract.

4.1 The Grant/Permit Holder will be responsible for any fire started by the Holder's employees or contractors in or out of the project area during construction. The Holder will reimburse government agencies for suppression and rehabilitation costs.

5.0 Authorized Officer

5.1 The Authorized Officer will be responsible for all fire control activities in his administrative unit. He will discuss fire protection stipulations with the Site Construction Manager concerning action to be taken and will notify the Site Construction Manager in writing when fire conditions warrant implementation of changes in fire plans.

5.2 The Authorized Officer will designate his on-the-job representative and notify the Site Construction Manager in writing.

6.0 Organization Flow Chart

6.1 The responsibility and documentation flow chart (Figure A-I) shows the organization of the wild fire program.

6.2 Directories will be prepared which will include the Construction Manager, Contractor(s), and BLM/FS personnel immediately concerned with the project. The directories will show names, company names, titles, addresses, and telephone numbers. Directories shall be updated as required. Copies will be distributed as shown in Section I, Article 3.6. The copies will be submitted to all participants in the preconstruction conference(s). (See Introduction, Section 1.5). The directories are based on the enclosed Documentation and Responsibilities Flow Chart.

6.3 The Contractor shall furnish a current list of employees and equipment used on the project to the Construction Manager when requested.

7.0 Emergency Fire Precautions During Fire Season

7.1 Fire condition classes based on standard vegetation fuel models will be used for the BLM/FS in determining curtailment of operations. The Authorized Officer may modify the following clauses, based on specific instances, to more closely reflect the true status of localized risks and hazards.

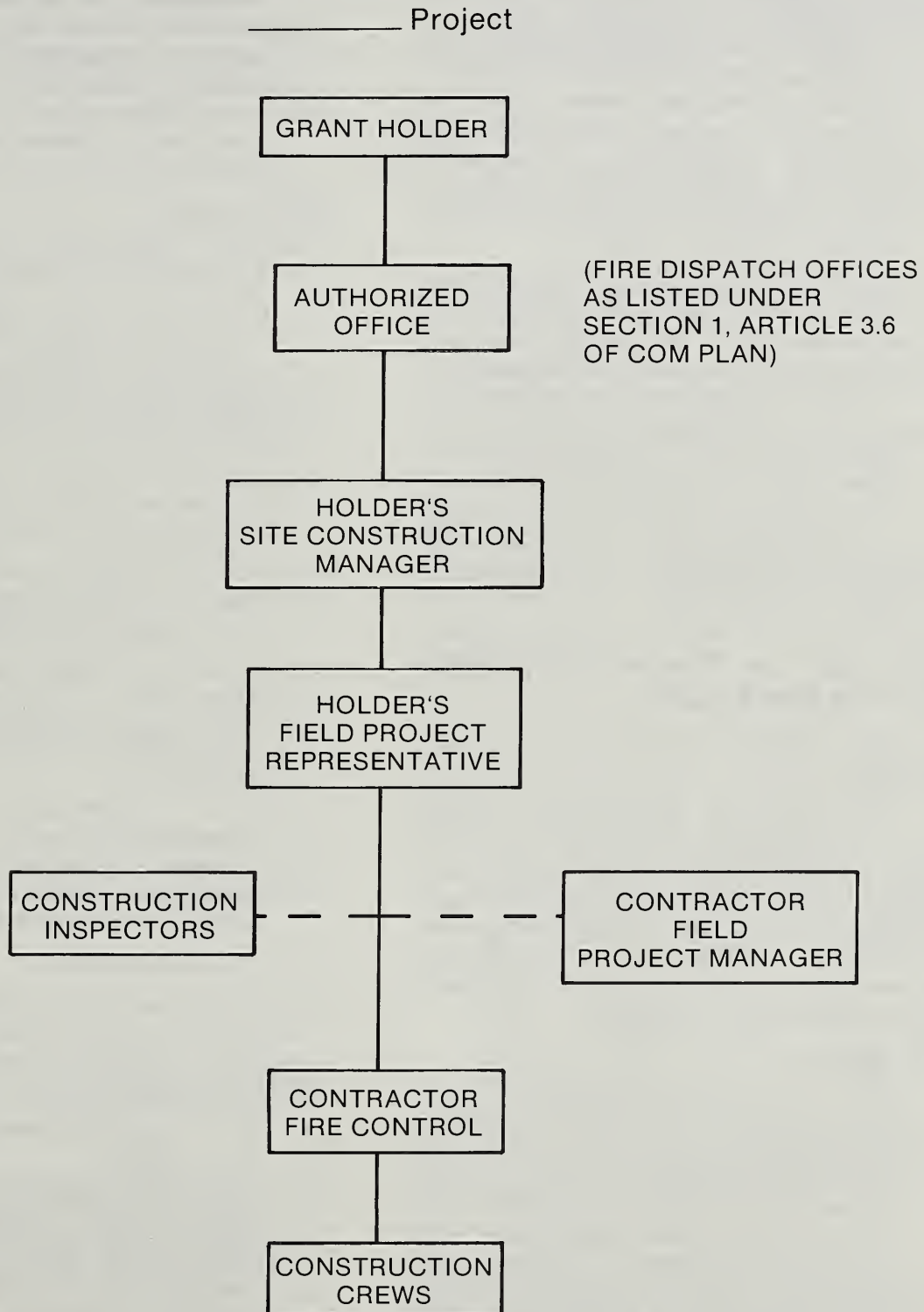
7.2 Predicted fuel model fire condition classes and their description of precautions are shown on Table A-1.

Table A-1
Emergency Fire Precautions

Fire Condition Class	Description of Precautions
0, 1, 2, 3	Normal fire precautions
4 (L to H)	Normal fire precautions except designated areas for smoking and warming or cooking fires shall require a written permit.
4 (Red Flag)	<p>Shutdown of a Contractor's operations or a project from 12:00 noon until 8:00 p.m. MST (1:00 p.m. to 9:00 p.m. MDT).</p> <p>All machine treatment of slash, skidding, yarding (if required), blasting, welding, metal cutting and off-loading on the right-of-way is subject to BLM/FS requirements. No smoking, warming or cooking fires shall be permitted. In addition:</p> <ol style="list-style-type: none">(1) Power saws shall be shut down from 9:00 a.m. until 8:00 p.m. MST (10:00 a.m. to 9:00 p.m. MDT).(2) Hauling trucks must be out of the project area to a surfaced road by 2:00 p.m. MST (3:00 p.m. MDT).(3) Operations on mineral soil involving road excavation, watering, grading (mineral soil) and/or other equipment maintenance (except refueling) may continue.
5 (Red Flag)	<p>Shut down all operations except operations on mineral soil involving road excavation, watering, and grading (mineral soil).</p> <p>Gravel surfacing may continue with special permit. The Site Construction Manager may restrict or shut down work on private property at his discretion during a Class 4 or Class 5 fire precaution period.</p>
Area Closures	Total shutdown of all operations and areas closed by entry.

APPENDIX A

**FIGURE A-1
WILD FIRE PREVENTION
DOCUMENTATION AND RESPONSIBILITY
FLOW CHART**



APPENDIX A

7.2.1 The responsible land management agency shall notify the Site Construction Manager each day of operation when there is a predicted change in fire precaution plans. This notification will be made between 3:00 p.m. and 6:00 p.m. MST (4:00 p.m. and 7:00 p.m. MDT) and will specify the numerical fire manning class to be followed the next day within the local operating areas. The Site Construction Manager shall notify the Contractor immediately; confirm such notification, in writing, to the Contractor; and make distribution thereof in accordance with Section I, Article 3.6.

7.2.2 The responsible land management agency shall, no later than 9:00 a.m. MST (10:00 a.m. MDT) on the following day, advise the Site Construction Manager of a change in the emergency fire precaution schedule. The Site Construction Manager shall notify the Contractor's Fire Control Representative immediately. Such notification shall be confirmed, in writing, by the Site Construction Manager with copies distributed in accordance with Section I, Article 3.6.

8.0 Specific Fire Precautionary Measures During Fire Season

Fire prevention consists of the following requirements.

8.1 Burning: The Grant/Permit Holder shall obtain permits for burning and include, in the permit application, any special provisions pertinent to the particular job. A copy of all permits shall be provided to the Site Construction Manager. This provision shall include right-of-way clearing and all clean-up, including trash and debris.

8.2 Blasting

8.2.1 When blasting is required for construction of access roads and foundations or any excavation, the Contractor shall use electric blasting caps only. During periods when Fire Manning Class 4 is in effect, the Contractor shall have a Fire Prevention Representative present at the site, who shall remain on duty for at least 1 hour after blasting is finished. The Contractor's Fire Prevention Representative shall be equipped with the following:

- (a) At least one Size 0 or larger shovel.

- (b) One back-pack pump filled with water.

8.2.2 Blasting hours are restricted under Fire Manning Class 4. Blasting is prohibited under Fire Manning Class 5. The Contractor shall provide the Site Construction Manager with a daily schedule, in writing. This schedule shall provide the reason for blasting, anticipated locations, and anticipated time for blasting. The Site Construction Manager will keep the BLM/FS notified of all schedules.

8.3 Welding

8.3.1 No welding, cutting, or drilling of steel structures or their component parts shall be without the approval of the Site Construction Manager. Where welding, drilling, or cutting is permitted by the Site Construction Manager, such activities shall be done in areas cleared to mineral soil a minimum of 10 feet around the welding, drilling, or cutting area. The Contractor shall provide the following equipment with the welding, drilling, or cutting operation:

- (a) One Size 0 or larger round, pointed shovel with long handle.

- (b) Two back-pack pumps full of water.

- (c) One 5-lb. dry powder or CO₂ fire extinguisher.

8.3.2 The Contractor's Fire Prevention Representative and the Site Construction Manager shall be notified by the Authorized Officer where welding, drilling, or cutting are to be done.

8.4 Spark Arresters

All internal combustion engines, stationary and mobile, shall be equipped with spark arresters, meeting FS and BLM standards, except as noted below.

8.4.1 Spark arresters shall be in good working order.

8.4.2 Light trucks and cars with factory-installed (type) mufflers, in good condition, may be used on roads where the roadway is cleared of all vegetation.

8.4.3 On roads where vegetation exists, spark arresters shall be used.

8.4.4 Vehicles equipped with catalytic converters are potential fire hazards and will be parked on cleared areas.

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8.5 Special Provisions

8.5.1 The Contractor shall furnish a list of equipment proposed for the project. All equipment assigned to the project may be inspected by the Authorized Officer before its use in construction of the project on National Forest land. An inspection sticker will be placed in a conspicuous place on the equipment. The equipment may be used on the project only while in good operating order.

8.5.2 If required, flues used in construction camps and material staging yards shall be equipped with spark arresters in good working order and meeting FS and BLM standards.

8.6 Lunch and Warming Fires

8.6.1 Permits shall be obtained by the Grant/Permit Holder for lunch or warming fires when weather conditions warrant. Permits shall:

8.6.1.1 Specify the use and location of fires.

8.6.1.2 Require that fires be completely extinguished at the end of the day or when abandoned.

8.6.2 Permits will be issued for use only in areas that require them. A copy of permits shall be provided to the Contractor by the Site Construction Manager.

8.7 Smoking:

Smoking signs and fire rules shall be posted on the project bulletin board at the Contractor's field office and at all show-up locations during the fire season.

The Contractor is responsible and shall:

8.7.1 Require supervisory personnel to enforce all rules.

8.7.2 Prohibit smoking except in designated areas approved by the FS and BLM.

8.8 Power Saws:

All gasoline-powered saws shall be provided with approved spark arresters/mufflers and shall be in good condition. Gasoline-powered chain saws shall be maintained in good condition throughout their assignment to the project. Chain saws and the operation of chain saws shall comply with the following requirements.

8.8.1 Arrester/muffler shall contain a 0.023-inch mesh, stainless steel screen.

8.8.2 During the period of use, the operator shall have with him:

(a) One Size 0, long-handled shovel with rounded point and maintained in good working order.

(b) Approved belt carrying-type fire extinguisher.

8.8.3 During operation of chain saws, the following conditions shall be adhered to:

(a) Fueling or refueling shall be in an area cleared of all material that will carry.

(b) Power saws shall be moved at least 10 feet from the place of fueling or refueling before starting.

(c) All gas shall be carried in metal safety cans.

8.9 Warning Devices:

Torches, fuses, highway flares, or other devices with open flames shall not be allowed. The Contractor shall use only electric or battery-operated warning devices within the project area.

8.10 Parking and Storage Areas:

If required, equipment parking areas and small stationary engine sites shall be cleared of all flammable materials as determined necessary by the Authorized Officer.

8.10.1 Gas and oil storage areas will be cleared of all flammable material as designated by the Authorized Officer, with "NO SMOKING" signs posted throughout the area.

8.10.2 All used and discarded oil, oil filters, oily rags, or other waste shall be disposed off BLM/FS lands in an approved sanitary land fill.

8.10.3 Glass jugs or bottles SHALL NOT be used as containers for gasoline or other flammable materials.

8.11 Equipment Refueling:

Fuel trucks shall have a 35-pound (minimum) fire extinguisher charged with necessary chemicals to control electrical and gas fires. If required, helicopter fuel trucks shall be grounded to the helicopter during refueling.

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9.0 Fire Presuppression During Fire Season

The Contractor shall comply with the following requirements.

9.1 Provide continuous access to all roads for emergency vehicles during construction.

9.2 Equip vehicles as follows:

9.2.1 Personnel vehicles, manhalls, trucks and tractors.

9.2.1.1 Minimum of one 5-lb. dry chemical fire extinguisher.

9.2.1.2 One round-pointed, Size O, long-handled shovel.

9.2.2 Pickup Trucks: Pickup trucks shall be equipped with:

9.2.2.1 One 2-½ lb. dry chemical fire extinguisher.

9.2.2.2 One round-pointed, Size O, long-handled shovel.

9.2.3 Water Tanker

9.2.3.1 The Contractor shall have on-site and available for use, in good working order within 1-hour response time, a water tanker having a capacity of 1,500 gallons and complying with the following requirements:

(1) A pressure pump.

(2) Adjustable nozzle.

(3) Minimum of 300 feet of 1-½ inch cotton jacket, rubber-lined hose with American National Standards Institute (ANSI) threads.

9.2.3.2 The above-specified equipment shall be available throughout the project, but may be requested in writing by the FS or the BLM during burning, blasting, and clearing.

9.2.4 Tool Caches

9.2.4.1 The Contractor shall purchase and furnish to the Site Construction Manager three 10-person tool caches. One cache will be placed in an Inspector's 4 x 4 vehicle associated with the right-of-way clearing, the construction of access roads, and construction activities. The second tool cache will be located with the construction/operation, and the third will be assigned to the Project

Fire Representative, who will have a Contractor's radio in his vehicle. The tool boxes shall be red in color, sealed with metal box-car-type seals, and labeled "FOR FIRE FIGHTING ONLY." The tool caches shall have the following tools placed therein.

(1) Ten electric headlamps with batteries.

(2) One first aid kit, ten-man unit.

(3) Two knapsacks.

(4) Five pulaskies with sheaths.

(5) Five long-handled, rounded-pointed, Size O shovels.

(6) Ten one-gallon canteens, filled with water.

9.2.4.2 The Site Construction Manager will have a Contractor-furnished radio installed in his vehicle and will immediately expedite the tool caches upon request of the Contractor's Fire Control Representative or his designated representative.

9.2.4.3 In case any tool cache has been used, the Contractor shall immediately replenish it. All first aid boxes replenished shall be inspected, stamped, and dated by an authorized laboratory. The first aid box shall then be wired or tied shut before placing in the tool cache.

9.3 Fire Suppression

9.3.1 The Contractor shall be responsible for fire suppression in his project area.

9.3.2 The Contractor shall take aggressive action to prevent and suppress fires within the project area.

9.3.3 The Contractor shall utilize his men and equipment on the project for fighting fires within the project area.

9.3.4 Project equipment to be made available for fire fighting will be placed under a rental agreement prior to the start of each fire season as provided for in the Construction Contract.

9.3.4.1 When fires are the responsibility of the FS or the BLM, labor and equipment will be paid for at current rental equipment and labor rates set forth in BLM/FS fire contracts.

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9.3.4.2 The FS and the BLM may call on the Contractor's men and equipment in emergencies for fires outside the project area. Payment will be made under Subarticle 9.3.4.1 above.

9.4 Contractor-Caused Fires:

Costs involved with Contractor-caused fires will be charged to the Contractor's account. There will be no time extension for delays caused by Contractor-related fires.

9.5 Fires Resulting from Third Parties:

Should the Contractor's men and equipment be utilized by the BLM or the FS on fires not caused by the Contractor, an extension of time will be given, if required. Costs to the Contractor during the fire will be reimbursed under Section I, Subarticle 9.3.4.1.

9.6 Part 9 of this Section will be in force for the duration of the project. The Plan shall be reviewed annually and revised as required. Should changes in the Plan require additional costs to the Contractor through men and equipment, the Contractor shall submit a request for additional monies required and/or reduction therefrom with the basis of cost calculations to the Construction Manager. The Construction Manager will review the cost impact with the FS and the BLM and make a recommendation to the right-of-way Grant/Permit Holder. Upon approval of a cost increase or a reduction in cost by the Grant/Permit Holder, the Construction Manager will notify the BLM, the FS, and the Contractor that the revised plan is in effect. Plan revisions required by the BLM/FS shall be carried out by the Grant/Permit Holder, and cost impact problems with the Contractors shall be resolved by the Grant/Permit Holder.

10.0 Duties Of Project Fire Representative

In addition to the responsibilities defined in Section I, Article 3.3, the Contractor shall designate a Project Fire Representative whose duties shall include:

10.1 Conduct regular inspections of all tools and equipment for compliance with FS and BLM specifications. Tool caches shall be inspected weekly during the fire season. The first aid box included therein SHALL NOT BE OPENED.

10.2 Acquire knowledge of all State, county, and Federal laws, ordinances and regulations pertaining to fire, flammable fuels, and explosives on the project and make regular inspections thereof. This inspection may be included with Section I, Article 10.1, but must be documented accordingly.

10.3 Post smoking and fire rules as indicated in Section 1, Article 8.7.

10.4 Make an initial attack on fires within the project area.

10.5 Accompany the Authorized Officer or his designated representative and the Site Construction Manager or his designated representative on fire inspections of the project.

10.6 Keep the Authorized Officer informed of all burning and blasting operations in accordance with Section 1, Articles 8.1 and 8.2.

10.7 Ensure that all project employees are aware of the contents of the Fire Protection Plan.

10.8 Remain on duty in the immediate area of construction whenever any construction activity is in progress and any additional periods, as specified under Section 1, Article 8.2.

10.9 Report all wild fires to the BLM/FS in accordance with Section 1, Articles 3.5 and 3.6.

10.10 Assume supervision of fire suppression activities until relieved by the Authorized Officer (see Section 1, Article 3.1).

10.11 The Project Fire Control Representative shall have in his 4 x 4 vehicle the equipment listed in Table A-2 furnished by the Contractor.

11.0 Notification of Condition Class

When required, the Site Construction Manager will inform the Contractor on a daily basis of the condition class, verbally and in writing, with confirming documentation to the FS, the BLM and the Contractor.

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**Table A-2
Required Fire Equipment**

Item	Description	Quantity
1	Pickup Truck (4x4), 3/4 Ton	1
2	Two-Way Mobile Radio Operating (Administrative Unit) Frequency	1
3	"Slip-On" Water Tank with 125 Gallon Capacity and Pump Units with Hose Fittings	1
4	Axe, Double Bit, Cruiser Type	1
5	Sheath for Axe	1
6	Pulaski Tool	2
7	Sheath for Pulaski Tool	2
8	Shovels, Long handle, Round Point, Size 0	2
9	Canteen, One .Gallon (Water)	2
10	Hard Hat	2
11	Headlamps, Electric	2
12	Back-Pack Pump, Complete	2
13	Hoses	
	(1) Cotton Jacket, 1-1/2" (NS Thread)	200'
	(2) Cotton Jacket, 1" (IP Thread)	400'
	(3) High Pressure, 1" (IP Thread)	250'
	(4) Suction, 1-1/2"	24'
14	Hose Fittings	
	(1) R-F Forester Nozzles	2
	(2) R-S Nozzle, Tips	
	(a) Fog	6
	(b) Straight Stream	6
	(3) Reducer, 1/-1/2" NS to 1" IP	4
	(4) Strainer, Suction, 1-1/2"	1
	(5) Siamese, 1-1/2" NS Thread, both Male and Female	1
	(6) Knapsacks	2
	(7) Spanner Wrench, Large (1-1/2" Hose)	1
	(8) Spanner Wrench, Small (1" Hose)	1
	(9) Carpenter Hammer	1
	(10) Pliers, Slip Joint	1

SECTION 2: CLEARING STIPULATIONS AND MITIGATION MEASURES

1.0 Purpose

To provide clearing stipulations and mitigation measures during construction of the (name of project) on FS or BLM rights-of-way.

2.0 Objective

To permit orderly completion of right-of-way clearing by the various methods approved by the Authorized Officer.

3.0 Approval

The Construction Manager will allow the Construction Contractor to begin clearing upon receipt of authorization to proceed with clearing by the Authorized Officer. The Contractor shall clear the right-of-way in accordance with the plan and profile, contract documents, and description of units shown therein. The road locations and tower sites/pipeline trenches will be flagged in accordance with provisions set forth in Section 6.

4.0 Stipulations

Clearing of the right-of-way for the (name of project) shall be restricted to the minimum necessary to provide safe construction, operation, and maintenance of the line. Clearing shall mean the removal or trimming of vegetation which would be a hazard to (powerline/pipeline) operation. General restrictions are described below.

4.1 Sidehill Cuts

Sidehill cuts will be necessary for the following functions and/or operations.

4.1.1 Construction of Access Roads: This task shall require approval of the Authorized Officer and the Construction Manager. Changes shall also require approval of the Construction Manager and the Authorized Officer.

4.1.2 Foundation Construction: Sidehill cuts for safe placing of equipment shall be approved by the Construction Manager and the Authorized Officer. Failure of the Contractor to comply with this provision may result in the shutdown of foundation construction. Shutdowns due to lack of approval which result in

additional costs to the Contractor or the Grant/Permit Holder shall be charged to the Contractor's account.

4.1.3 Tower Installation (Electrical Transmission Lines): Sidehill cuts for safe placing of a crane or other tower assembling, erecting, hauling, loading, and off-loading shall be approved in advance by the Construction Manager and the Authorized Officer. Failure by the Contractor for noncompliance with this requirement may result in the shutdown of the tower installation operation, and any additional costs to the Contractor or the Grant/Permit Holder shall be charged to the Contractor's account.

4.1.4 Conductor Operation (Electrical Transmission Lines): Sidehill cuts for conductor stringing, specifically for placement of conductor reel trailers, tensioning equipment, temporary snubs, and hold-downs may be required. Sidehill cuts for conductor setups shall be approved in advance of conductor stringing operations by the Construction Manager and the Authorized Officer. Changes may be required and shall be approved in advance by the Construction Manager and the Authorized Officer before work on the change request can begin. Failure of the Contractor to obtain approvals or to comply with contract requirements shall cause shutdown of the conductor operation. Any additional costs to the Contractor or the Grant/Permit Holder resulting from a shutdown for noncompliance for sidehill cuts shall be charged to the Contractor's account.

4.1.5 Working Plane (Pipelines): Sidehill cuts for a safe and stable plan for equipment within the right-of-way shall be approved in advance by the Construction Manager and the Authorized Officer.

The split-level or two-toning sidehill construction method will be employed, as required by the Authorized Officer, to minimize cuts and high walls. This involves two step-like work planes to move equipment, bring up additional pipe by tractor, and provide a trench and a pipe fabrication/holding area. Pipe is usually laid from the same side for the length of the spread. If necessary, equipment can be moved to the opposite side of the trench to lay the pipe. Cut and fill, using

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some of the excavated material from the sidehill cut, will provide a portion of the level work plan for the construction equipment. The remainder of the excavated material will be stored on the construction right-of-way downhill from the work planes or hauled to an approved storage site. The down-slope storage area, consisting of a mounded windrow of material, will not be graded level.

Following pipe fabrication and lowering into the trench, the excavated material will be used to fill the two-toning cuts. The Contractor will restore the area as nearly as possible to its previous grade. Excess material will be incorporated into the berm over the pipeline to compensate for natural compaction. Slope restoration, revegetation, and rehabilitation measures will include precautions to maintain slope stability and to control surface and subsurface drainage.

Failure by the Contractor for noncompliance with this requirement may result in the shutdown of the pipeline installation operation, and any additional costs to the Contractor or the Grant/Permit Holder shall be charged to the Contractor's account.

4.1.6 Method of Change Request for Sidehill Cuts: Should the Contractor decide to change the location or stipulations to a previously requested sidehill cut, he shall make such a request in writing to the Construction Manager. The request shall show the previously approved sidehill cut in detail on a construction sketch and the revision thereto. The Construction Manager will notify the Authorized Officer and request approval. The Authorized Officer may approve or may provide assistance during the process or request revisions thereto. Approval of the Authorized Officer is required.

4.2 Construction Plan:

The construction documents will include the construction plan.

4.2.1 Clearing of Vegetation: Vegetative patterns will be identified and mapped on the plan and profile. This information will be used to determine type and amount of clearing. Clearing of vegetation will be subject to certain restrictions which may

be specified in detail due to environmental reasons. This stipulation refers to Section 2, Subarticle 4.2.5.

4.2.2 Special Clearing Requirements (Electrical Transmission Line): The (name of project) transmission line is expected to include dangerous trees. The amount of trimming will be included on a site prescription form prepared with and approved by the BLM/FS.

4.2.3 Selective Topping, Selective Removal, Patch Cutting of Trees (Electrical Transmission Lines and Pipelines): The construction plan will identify where selective topping, selective removal, and patch cutting of trees will be done. This will be shown on the site prescription form and/or plan and profile. (Note: Refer to Appendix I of this COM Plan procedure for a cutting guide for topping or removal of trees.

4.2.4 Skid Trails, Log Decks, Wood Chipping Areas, Slash Burning, Lop and Scatter Areas, and Firewood Decks: The construction plan will identify skid trails, log decks, wood chipping areas, slash burning areas, lop and scatter areas, and firewood decks. This will be shown on the site prescription form and/or plan and profile.

4.2.5 Straight Line Clearing: The Contractor shall not use straight line clearing unless authorized in writing by the Site Construction Manager and the Authorized Officer.

5.0 Mitigating Measures

5.1 Vegetative Cover and Protection of Soil

5.1.1 Vegetative Cover (Electrical Transmission Lines): Vegetative cover shall be protected and preserved as directed by the Authorized Officer. On electrical transmission line rights-of-way, marketable trees will not be cut or removed unless marked.

5.1.2 Soil: As directed by the Authorized Officer, the Construction Manager shall limit and restrict the Contractor in traversing the right-of-way with vehicles and equipment outside of designated roads or working planes. Soil will be protected and preserved as directed by the Authorized Officer.

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5.2 Vegetation Definition

Vegetation shall consist of four categories:

5.2.1 Marketable Timber: Marketable trees that are cut, injured, or destroyed shall be paid for by the Grant/Permit Holder at current stumpage rates applicable to the sale area. The timber will be collected, removed, and disposed of as directed by the Authorized Officer. (Refer to Introduction, Section 2.3.1.)

5.2.2 Nonmarketable Timber: Nonmarketable timber may be disposed of as approved by the Authorized Officer in any of the following manners. (Burning shall be subject to the provisions of Section 1.)

5.2.2.1 Stacked at the side of the right-of-way and burned in accordance with authorized permit.

5.2.2.2 Stacked on the side of the right-of-way and chipped.

5.2.2.3 Other disposal as approved by the Site Construction Manager and the Authorized Officer.

5.2.3 For understory and/or marketable vegetation, the Contractor shall use the same procedures as set forth in Section 2, Subarticle 5.2.2.

5.2.4 Ground cover shall be left in place on electrical transmission line rights-of-way unless directed otherwise by the Authorized Officer. If stockpiling of ground cover is agreed to be a fire hazard by the Site Construction Manager and the Authorized Officer, it will be stacked at the side of the right-of-way and burned, subject to authorized burning permits, in accordance with Section 1. Ground cover which is not a fire hazard shall be used for right-of-way restoration as mulch and soil erosion control.

5.3 Disturbed Topsoil

Stockpiling of topsoil shall only be done if directed by the Authorized Officer. Topsoil will not be used as fill material. Stockpiled soil shall be used as a topping in restoration of access roads, ruts, soil erosion prevention, placing around footings, restoring sidehill cuts, stringing operations, and general right-of-way ground disturbance.

5.4 Tree Cutting Requirements

5.4.1 Vegetation Including Stump Heights: The remaining portion of all

removed vegetation (marketable timber, nonmarketable timber, and understory types) except in specified areas (as set forth in Section 2, Subarticle 5.4.2), shall not exceed 6 inches diameter at breast height (DBH).

5.4.2 Specified Areas: In sensitive areas, such as high erosion potential or sensitive visual impact areas, consideration will be made to require equipment for skidding logs to have a maximum lbs. per square inch (psi) of nine when loaded.

For environmental considerations near proposed access roads, certain areas may be specified in the construction contract where the Contractor shall leave the stumps as near to the ground level as practical with the undercut face away from the travel route. The Authorized Officer shall specify areas on site prescription forms, in this section, or on the plan or profile where stumps will be as near to the ground as practical.

5.4.3 Protection of Leave Trees: The Contractor shall protect leave trees during clearing by wedging or pulling with a line as necessary to fell trees without damaging leave trees.

5.5 Archeological Sites:

Removal of vegetation on inventoried archeological sites will not be permitted until such sites have been mitigated. These sites shall be flagged in accordance with Section 8. Failure of the Contractor to comply with this provision may result in shutdown of the clearing operation. Any costs to the Contractor or the Grant/Permit Holder as a result of a shutdown caused by noncompliance shall be charged to the Contractor's account.

5.6 Vegetation

All vegetation to be cut or removed will be designated by the Authorized Officer.

5.7 Slash Cleanup Methods

5.7.1 Construction slash from marketable timber, nonmarketable timber not used as cord wood, understory more than 6 inches in diameter and 8 feet long, and concentrations of construction slash will be treated by one or a combination of the following methods:

5.7.1.1 Hydro-ax.

5.7.1.2 Lopping and scattering.

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5.7.1.3 Chipping: If chipping of slash is used, the chips left on the ground will not be deeper than 3 inches, and the green chips will be fertilized to prevent soil denitrification. Nitrogen fertilizer will be applied at the rate of 200 lbs. of available nitrogen per acre.

5.7.1.4 Hauling out to a designated location (if no other method is feasible).

5.7.1.5 Burning and/or burying.

5.7.1.6 Use in watershed management structures.

5.7.2 Disposal of Slash: The Contractor shall base the disposal of slash on the following requirements.

5.7.2.1 Use of a hydro-ax.

5.7.2.2 Lopping and scattering of all slash in areas of helicopter construction or difficult access areas. Scattering of slash shall be made over the disturbed area at no greater than 18 inches high.

5.7.2.3 Chipping of construction slash, up to 4 inches in diameter, shall be processed through a chipping machine. The chips shall be deposited to a loose depth not to exceed 6 inches.

5.7.2.4 If required, slash shall be hauled to a central location designated by the Authorized Officer for the later use of the BLM/FS.

5.7.2.5 Burning of slash shall be in accordance with provisions in Section 1.

5.7.2.6 When requested by the Chief Inspector and approved by the Authorized Officer, the Contractor shall place combustible slash in drainage patterns to retard water flow and slow the rate of erosion. The request, when made and approved by the Authorized Officer, shall be in writing and shall show the location and size of pattern in which slash is to be placed.

5.7.3 The Contractor shall not unilaterally place slash and non-combustible debris in streams, stream beds, lakes, or meadows. If clearing is required in these areas, the slash shall be removed and

disposed of in an area and manner approved by the Site Construction Manager and the Authorized Officer.

5.7.4 The Contractor shall dispose of residual slash and stumps as provided in Section 2, Subarticles 5.7.1 and 5.7.2.

5.7.5 Protection from Damage: In addition to the requirements under Section 2, Article 5.1, the Contractor shall protect from damage throughout the construction period trees, shrubs, grass, and topsoil which are not designated to be cleared or driven over.

5.7.6 Pruning Requirements: The Contractor shall prune or trim limbs from trees, flush with the trunk of the tree, using shears or saws.

5.7.7 Specific Clearing and Slash Treatment Restrictions

5.7.7.1 Areas considered as sensitive impact areas, compiled from the Final EIS and subsequent field studies, are included in Appendix A of this COM Plan and on the site prescription forms.

(1) Sensitive resource areas include, but are not necessarily limited to:

(a) Sensitive road crossings.

(b) Landscapes of high visual quality designation.

(c) Ecologically sensitive habitat.

(d) Stream or river crossings.

5.7.7.2 Special Clearing Requirements

(1) The Contractor shall use selective vegetation clearing along primary or improved road crossings and crossings of recreation trails.

(2) A visual buffer of trees and/or brush will be retained across the right-of-way and adjacent to the road and trail to screen the clearing operation from viewers along the highway/trail.

(3) Access roads which intersect existing roads shall be located diagonally through the vegetative screen to minimize views down the right-of-way. If the road crossing significantly reduces the screening potential, an

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alternate road location will be provided and approved by the Construction Manager and the Authorized Officer.

(4) Clearing and slash disposal in areas of visual sensitivity (e.g., recreational areas and visual resource management landscapes) shall be approved by the Site Construction Manager and the Authorized Officer.

(5) Rivers and Streams: The following requirements prevail and shall require detailed plans on methods approved by the Construction Manager and the Authorized Officer.

(a) Site-specific plans for right-of-way clearing, including disposal.

(b) Site-specific plans for access road construction.

(c) Site-specific plans for foundation excavation and disposal (electrical transmission lines).

(d) Site-specific plans for steel assembly and erection (electrical transmission lines).

(e) Site-specific plans for conductor installation (electrical transmission lines).

(f) Site-specific plans for trenching, lowering in, and backfilling (pipelines).

(g) Site-specific plans for right-of-way cleanup.

(6) Existing ground cover shall be protected in accordance with Section 2, Subarticle 5.2.4. The Contractor shall not cross any stream on the line without prior written authorization from the Site Construction Manager and the Authorized Officer.

(7) As required by the Authorized Officer, the Site Construction Manager shall restrict or stop Contractor's construction operations during adverse weather conditions to prevent rutting or excessive scarring and deterioration of the soil. The Site Construction Manager shall notify the Contractor to restrict or stop work.

(8) Construction activities will follow clearing operations at a reasonable rate of progress to allow clean-up operations to proceed continuously throughout the project.

5.7.8 Overburden and Excess Material Disposal

5.7.8.1 Surface disturbance of the right-of-way during construction may occur at any of the following construction operations:

(1) Right-of-way clearing (electrical transmission lines or pipelines).

(2) Access road construction (electrical transmission lines or pipelines).

(3) Foundation excavation (electrical transmission lines).

(4) Foundation backfill (electrical transmission lines).

(5) Structure assembly and erection (electrical transmission lines).

(6) Conductor stringing (electrical transmission lines).

(7) Counterpoise installation (electrical transmission lines).

(8) Trenching (pipelines).

(9) Backfilling (pipelines).

(10) Restoring to natural contour (electrical transmission lines or pipelines).

5.7.8.2 When surface disturbance occurs, the overburden shall be stockpiled along the right-of-way, and all material acceptable to the Authorized Officer shall be returned to the area disturbed.

(1) All topsoil shall be spread evenly around the foundation, over the right-of-way, or used in the clean-up operation for grading and slope (see Section 2, Article 5.3).

(2) Any excess material not used for backfill shall be disposed of as approved by the Site Construction Manager and the Authorized Officer.



SECTION 3: EROSION CONTROL, REVEGETATION, AND RESTORATION MEASURES

1.0 Purpose

To provide rehabilitation and erosion control provisions, mitigation measures, and outline actions to be taken during the construction of the (name of project) across BLM and FS lands.

2.0 Objective

To protect and restore the right-of-way and prevent erosive damage during and after construction of the (name of project) across BLM and FS lands.

3.0 Closure of Designated Roads

3.1 Abandonment of Temporary Roads

3.1.1 The abandonment of temporary roads shall be accomplished as follows or, if directed by the Authorized Officer, as outlined in Article 3.2 of this section.

3.1.1.1 The natural contours in cut and fill areas shall be restored by use of a "grade-all" or equipment that shall achieve comparable results.

3.1.1.2 All sideslopes shall be constructed to retain their natural slope as far as practical.

3.1.1.3 All ruts, scars, and artificial ditches shall be filled in accordance with Section 2.

3.1.1.4 All culverts shall be removed and drainage channels left in a natural state unless otherwise directed by the Site Construction Manager and approved by the Authorized Officer. Costs for removal or other work shall be charged to the Contractor's account.

3.1.1.5 All roadways that are abandoned shall be revegetated in accordance with Section 3, Article 4.0.

3.1.1.6 In areas where no cut or fill is made the roadway will be ripped or scarified and will be completely blocked by barriers of native material, as directed by the Site Construction Manager and approved by the Authorized Officer.

3.2 Abandonment of Existing Roads

3.2.1 Existing roadways used during construction under a use permit or grant and as directed by the BLM/FS shall be abandoned as follows:

3.2.1.1 All disturbed roadway areas shall be revegetated in accordance with Section 3, Article 4.0.

3.2.1.2 The existing roadway shall be abandoned by rough grading, ripping or scarifying, cross-ditching, and opening drainage to prevent erosion and enhance revegetation.

3.2.1.3 Work on roadways shall not commence until after the designated sections of existing roads are no longer needed to serve construction traffic.

3.2.1.4 The Contractor shall fill all ditches, ruts, and depressions as noted in Section 3, Subarticle 3.1.1.3.

3.2.1.5 Where required, live streams and other drainages shall be opened by removing the abandoned structures and grading the approach fills. Stream flows shall not be impaired.

3.2.1.6 The Contractor shall be responsible for proper drainage on the right-of-way or as specified through special use permits during the construction period. The Contractor shall divert concentrated water flows from roadways and other disturbed areas into safe areas. Flowing water shall not be directed into natural stream channels without the approval of the Site Construction Manager and the Authorized Officer. The Contractor shall spread flowing water over undisturbed soil.

3.2.1.7 After rough grading in accordance with Section 3, Subarticle 3.2.1.2, the Contractor shall cross-ditch the roadway and install water bars. Water bars shall be sloped with the grade and cut to a minimum 12-inch depth below the surface. The grade of the water bar shall be 2-percent greater than the grade of the road.

3.2.1.8 Excavated materials from cross-ditching and water bar installation shall be placed on the downgrade

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side of the ditch and extend from the outside shoulder line into the back-slope to form a positive intercepting ditch.

3.2.1.9 Water bars shall be spaced on road grades greater than 4 percent (i.e., 4- to 8-percent grade on 200-foot intervals and greater than 8-percent grade on 100-foot intervals). In addition, water bars shall be installed at all alignment changes (curves), significant grade changes, and as requested by the Authorized Officer with notification to the Contractor in writing by the Site Construction Manager.

3.3 Off-Road Tracts:

Off-road tracts on and off the right-of-way shall be treated in accordance with Section 3, Article 3.I.

3.4 Identification of Closed Roads

3.4.1 Roads, when closed, shall be posted by the Contractor with signs as directed by the Authorized Officer. The signs shall explain why closure is necessary (e.g., ROAD CLOSED TO PROTECT WATERSHED AND WILDLIFE).

3.4.2 Closure signs shall be on metal backs of a 24" x 24" square shape and mounted on wooden posts.

3.4.3 The signs shall be lettered in black and border on a yellow background.

3.5 Abandoned Structures:

Salvageable and nonsalvageable material shall be disposed of in accordance with the Construction Contract or as requested by the Authorized Officer and communicated to the Contractor in writing.

4.0 Revegetation of Disturbed Areas

4.1 The Contractor shall be responsible for erosion control and revegetation measures on the right-of-way during the construction period.

4.2 The Grantee shall restore the right-of-way as specified in the COM Plan to a stable condition acceptable to the Authorized Officer.

4.3 Backfilling, Grading, and Topsoil

4.3.1 Contours of the ground shall be restored to permit normal surface drain-

age along the right-of-way and other special permitted areas.

4.3.2 Topsoil shall not be stripped and/or stockpiled at construction sites and such other locations of disturbance along the right-of-way unless indicated and approved on a corresponding site prescription form.

4.3.3 Excess excavated material not used for backfill shall be evenly spread on cleared areas prior to replacing the topsoil. The Site Construction Manager may direct the Contractor to remove unsuitable backfill from the site as requested by the Authorized Officer in writing (see Section 2).

4.3.4 Erosion control structures such as water bars, diversion channels, and terraces shall be constructed to divert water and reduce soil erosion along rights-of-way or other areas disturbed by construction.

4.3.5 All structures such as terraces, levees, underground drainage systems, irrigation pipelines, and canals shall be restored to preconstruction conditions so they will function as originally intended.

4.3.6 Temporary work space areas used at stream and highway crossings and other special sites shall be restored to preconstruction condition or to a condition acceptable to the Authorized Officer and Site Construction Manager. The upland areas and banks will be revegetated to simulate preconstruction conditions. Where revegetation is not possible, the banks will be protected with rock. The streambed will be returned to its original elevation and grade.

4.4. Land Preparation for Seeding and Cultivation:

Construction operations are expected to cause excess compaction and damage soil conditions, affecting soil productivity and reducing seeding success in the right-of-way area. These specifications will insure that the Contractor utilizes practices and techniques improving altered soil conditions, protecting from erosion, and improving seeding.

4.4.1 Where construction areas are subject to strong erosional forces prior to vegetation re-establishment, special mulching practices or matting shall be used to

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promote physical stabilization. Snow fences along linear rights-of-way will be constructed where appropriate to prevent further erosion.

4.4.2 In addition to installing erosion-control structures, erosion-prone areas shall be reseeded, using supplemental fertilizers as necessary.

4.4.3 Soils shall be prepared to provide the best possible conditions for the establishment of grass species.

4.4.4 Rock mulches shall be used in steep-sloping rock outcrop areas to reduce erosion and promote vegetal growth.

4.4.5 Cultivation and land preparation operations on steeply sloping areas, whether by machine or by hand, shall be done on the contour to minimize erosion.

4.4.6 Soil areas with rock fragments, such as very coarse gravel, cobble, or stone scattered on the surface, shall be restored to simulate the original preconstruction surface condition and to blend with the adjoining area.

4.4.7 All closed roadbeds and other designated areas where soil disturbance has occurred shall be scarified to a condition acceptable to the Authorized Officer and Site Construction Manager. Whenever possible, scarification shall be on the contour. However, roadbeds may be scarified the length of the road regardless of contour. Scarification shall be at least 12 inches deep with rippers not more than 16 inches apart.

4.4.8 Chiseling will be used in rangeland areas to reduce compaction and improve soil permeability, unless directed otherwise in writing by the Site Construction Manager in response to direction from the Authorized Office. Pitting and contour furrowing, as directed by the Site Construction Manager and the Authorized Officer, shall be done as needed on steeper slopes of disturbed areas to increase infiltration and to reduce runoff and erosion.

4.4.9 Commercial fertilizer shall be applied to soil areas with low inherent fertility to maintain crop yields and establish grass seedings. Application rates will be commensurate with annual precipitation.

4.4.10 Erosion control structures and

measures shall be applied on sloping areas to reduce accelerated erosion, to allow re-establishment of preconstruction surface soil conditions, and to allow natural revegetation.

4.5 Revegetation (Reseeding and Planting)

4.5.1 Reseeding and specific information and requirements for revegetation on the (name of project) are shown on the Site Prescription Forms.

4.5.2 Changes may be required during construction due to changing conditions. The Authorized Officer may request a change, and the Construction Manager shall be responsible for having the Contractor or others complete the requested changes.

4.5.3 The appropriate seed mixtures and fertilizer application rates from Table A-3 will be used.

Table A-3
Seeding Species for Erosion Control¹

District	Packet Number	Species	Pounds/Acre
(BLM)	1 (Low elevations)		
		Total	
(BLM)	2 (High elevations)		
		Total	
(FS Lands)	National Forest		
	FS 1		
		Total	
	FS 2		
		Total	
	FS 3		
		Total	

¹ This seed packet information will also apply to all access roads to be closed and/or rehabilitated. (NOTE: Information contained in this table is supplied by the BLM/FS and will be used in conjunction with the Tower/Pipeline Site Prescription Forms.)

4.6 Seeding Requirements

4.6.1 Seeding shall be done in the fall following the last activity that causes disturbance of any area, except the work will be performed only at times when weather, moisture, and other conditions at the site are favorable. No work will be performed when wind conditions prohibit

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uniform distribution of seed, or when the ground is frozen or snow-covered.

4.6.2 Mechanical spreaders shall be used for spreading fertilizer except on steep slopes where fertilizer cannot be incorporated effectively by mechanical equipment. In that case, fertilizer may be applied by other approved methods and hand worked to incorporate into the soil.

4.6.3 Mulching will be accomplished within 24 hours following seeding with weed-seed-free mulch. It may be spread by hand, by a blower, or by other equipment. Straw mulch will be treated by like methods.

4.6.3.1 Mulching, using sterilized products, may be directed by the Site Construction Manager and approved by the Authorized Officer.

4.6.4 Surfaces or gullies otherwise damaged following seeding and mulching will be repaired by regrading, reseeding, refertilizing, and remulching, as necessary, to maintain the areas in satisfactory condition for 5 years.

4.6.5 Seeding will be considered acceptable and completed when a full stand

of vegetation completes two growing seasons.

4.6.6 Seed will be planted by drilling, broadcasting, or hydroseeding.

4.6.7 A grass drill equipped with depth bands will be used where topography and soil conditions allow operation of equipment.

4.6.8 Broadcast seeding will be used for inaccessible or small areas not suitable for mechanical methods. Seed shall be covered by raking or harrowing.

4.6.9 Hydroseeding will be done in critical areas, as requested by the Authorized Officer. Notification should be provided to the Site Construction Manager. Hydroseeders shall be equipped with a rubber-coated gear pump and a paddle tank mixer.

4.6.10 Seed shall be certified by an independent testing laboratory to meet the following Federal agency seed requirements: (1) certified tag—certification by State Department of Agriculture; (2) seed not older than two crop years; and (3) seed at least 90-percent pure when certified.

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SECTION 4: TRANSPORTATION

1.0 Purpose

To mitigate, supplement, and further outline measures required for road access during the construction of the (name of project) across lands administered by the BLM/FS.

2.0 Objective

2.1 To mitigate the adverse impacts of project-related road use and construction activity on affected resources.

2.2 To maintain and/or moderately upgrade existing access roads, consistent with project needs relating to the useful management of resources.

2.3 To hold mileage of new road construction to the minimum required for timely completion of the project. Only those roads essential to land management and/or line maintenance will be retained.

2.4 To study the proposed location of all new roads in the planning stages in concert with local BLM/FS personnel. Where so stipulated by the BLM/FS, the roads will be completely restored to the natural contour upon completion of their use.

2.5 To provide a standard of design for new roads that will minimize and control erosion, degradation of water quality, and damage to the watershed.

3.0 General Requirements

The Contractor shall construct access roads in accordance with the construction plan and profiles, drawings, and technical requirements.

3.1 The Contractor(s) shall construct access roads in accordance with FS/BLM permits and grants and in accordance with the construction plan and profile. The construction plan and profile will become part of the FS/BLM permits and grants by reference and will be appended to this COM Plan.

3.2 The Contractor(s), in conjunction with the Authorized Officer, shall identify on the construction plan and profile new roads to be constructed, existing roads to be reconstructed, existing permanent roads to be used with only minor maintenance, and areas where overland travel will be allowed (with either no or minor blading of ground cover).

3.2.1 New roads to be constructed.

3.2.1.1 The construction plan and profile will show which roads:

(1) Will be permanent and retained for public use upon completion of the project;

(2) Will be permanent and retained for use by only the right-of-way holder for maintenance purposes; and

(3) Will be temporary and closed upon completion of the project.

3.2.2 Existing roads to be reconstructed.

3.2.2.1 The construction plan and profile will show which roads:

(1) Will be permanent and retained for public use; and

(2) Will be temporary and closed upon completion of the project.

3.3 Construction standards included in the construction plan consist of:

3.3.1 All planned changes and improvements to existing roads.

3.3.2 Location plans for temporary access roads.

3.3.3 United States Geological Survey (USGS) 7.5- or 15-minute quadrangle maps delineating all roads to be used for access.

3.3.4 Plans, profiles, and details of new permanent access roads.

3.3.5 Applicable portions of BLM Document 9113.

3.4 Construction-related travel shall be restricted to the designated access road rights-of-way. Existing roads shall be used wherever possible. Unauthorized cross-country vehicular travel by construction and operation crews is prohibited.

3.5 Earth borrow material on BLM/FS land shall be obtained only from areas approved by the Authorized Officer.

3.6 Construction shall be suspended if weather or ground conditions are such that excessive soil damage will occur, as determined by the Authorized Officer. The Contractor shall be notified in writing by the Site Construction Manager.

3.7 Waste material on BLM/FS land will be disposed of only in areas approved by the Authorized Officer.

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3.8 Temporary Overland Access Routes

3.8.1 Where stipulated by the BLM or FS, overland access shall be used. Travel outside the designated areas will be prohibited.

3.8.2 Overland access routes shall be staked and flagged, but no blading or grading will be permitted. Only that clearing and removal of obstructions required to permit travel by off-road vehicles (ORVs) will be permitted. Overland travel will be prohibited when weather conditions are such that ruts in excess of 6 inches will result.

(Note: Construction standards can be put in table form as found in Chapter II, Table 2, or the standards can be in narrative form as shown in the following sections.)

3.9 New or Reconstructed Access Roads

3.9.1 New access roads on BLM-administered lands shall be designed and constructed in accordance with the applicable portions of BLM Document 9113 as pertains to resource roads in mountainous areas.

On lands administered by the FS, new or reconstructed access roads shall be designed and constructed in accordance with the permit covering the particular road(s) in question. (See Subsection 3.1, Introduction.)

3.9.2 The Construction Contractor(s) shall be responsible for proper drainage on the right-of-way or as specified through use permits during the construction period. The Contractor(s) shall divert concentrated water flows from roadways and other disturbed areas into safe areas. Flowing water shall not be directed into natural stream channels without the approval of the Construction Manager and the Authorized Officer. The Contractor(s) shall spread flowing water over undisturbed soil.

3.9.3 After grading of unsurfaced roads, the Contractor shall cross-ditch the roadway and install water bars. Water bars shall be sloped with the grade. The grade of the water bar shall be 2 percent greater than the grade of the road.

3.9.4 Excavated materials from cross-ditching and water bar installation shall

be placed on the downgrade side of the ditch and extend from the outside shoulder line into the backslope to form a positive intercepting ditch.

3.9.5 Water bars shall be spaced on unsurfaced road grades of 2 to 4 percent at 400-foot intervals, 4 to 8 percent at 200-foot intervals, and greater than 8 percent at 100-foot intervals. In addition, water bars shall be installed at all alignment changes (curves), significant grade changes, and as requested by the Authorized Officer and communicated in writing by the Construction Manager.

3.10 Existing Roads

3.10.1 Existing roads, structures, or drainage facilities which are damaged by the construction activity shall be replaced or repaired to a condition equal to or better than that which existed before the start of the project.

3.10.2 The roadway width of existing roads shall be maintained. Roadway widths shall not be increased nor alignment changes made without approval of the Authorized Officer.

3.11 Special Roadway Requirements

3.11.1 Roads crossing streams or washes at grade will be permissible unless otherwise specified. Where culverts are required in stream crossings, such culverts shall be of adequate size to accommodate the runoff of a 10-year storm for temporary roads and a 50-year storm for permanent roads and of sufficient strength to support construction and maintenance equipment.

3.11.2 Ditches shall be constructed where necessary, but held to a minimum. Where ditches are installed, provisions shall be made to dispose of the accumulated water by one of the following methods:

3.11.2.1 Using wing ditches.

3.11.2.2 Directing water into stream channels with provisions to prevent silting of channel from roadway runoff.

3.11.2.3 Carrying water under or across the roadway by means of culverts or grade dips. Such structures shall be designed and installed so that

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erosion will not occur on the outlet slope.

3.11.3 Removing, repairing, replacing, and/or constructing improvements which are damaged, destroyed, or made necessary by the exercise of the rights granted herein as follows:

3.11.3.1 Protect, box, and pipe water outside of road right-of-way for any spring encountered during construction.

3.11.3.2 Provide permanent cattle-guards or 16-foot steel gates for the following situations:

1. To avoid safety hazards.
2. To upgrade roads covered in the construction contract.
3. To replace a permanent existing cattleguard when it is damaged or destroyed by construction activities.
4. When in accordance with plans approved by the Authorized Officer.
5. To provide temporary cattle-guards or a steel gate on all fences crossed with temporary roads.
6. To provide permanent cattle-guards on all fences crossed by permanent roads.
7. To provide a 16-foot gate in the fence immediately adjacent to the cattleguard to allow access by heavy equipment.

3.11.4 Wet and poorly drained roads shall not be used if deep rutting (in excess of 6 inches) will occur, unless approved by the Authorized Officer with written notification to the Contractor by the Site Construction Manager.

3.11.5 When directed by the Authorized Officer, dust control measures shall be used on all roads when dusting creates a nuisance, safety hazard, or damage to the existing road. Use of dust pallatives such as chlorides, oils, or other chemicals shall require prior approval of the Authorized Officer with specific approval notification to the Contractor, in writing, by the Site Construction Manager.

3.11.6 The fire protection, erosion control, revegetation, and restoration measures, clearing and flagging stipulations,

and mitigation measures shall be considered a part of this section in their application to the appropriate phases of road construction (see Sections 1, 2, and 3).

3.11.7 Surfacing of permanent roads shall be optional, but if needed and approved by the Authorized Officer to allow construction to proceed, the surface will be applied during dry weather conditions when the roadbase is stable. Surfacing shall not be applied while a road is closed due to wet conditions.

4.0 Conditions for Road Access

4.1 The following conditions shall be used to govern the location, use, and closure of access roads for project construction. These conditions apply only to roads that are actually needed and used during construction.

4.1.1 Locate all access roads to fit the topography and minimize sidehill cuts. Short roads from existing roads to each tower site will be used to the extent practical.

4.1.2 The location and description of specific temporary and permanent access roads are specified on the plan and profile drawings. The plan and profile drawings along with the site prescription forms for the various BLM districts and National Forests should be included in the Appendix section of a COM Plan.

4.2 Cleaning of Culverts and Ditches

4.2.1 The upper and lower ends as well as the inside of the pipe shall be thoroughly cleaned to provide an unobstructed flow to and through the pipes. Any loose material on the backslope adjacent to the entrance of culverts shall be removed.

4.2.2 All roadway ditches, lead-offs from culverts or cut sections, and lead-in ditches shall be cleaned of any material that would obstruct the flow. The work shall be accomplished so that reasonable conformance to previous line, grade, and cross section will be achieved.

4.3 Grade Dips: Grade dips shall be constructed and/or maintained to a sufficient depth and width to adequately drain the roadway and will not be flat bladed over and filled in, except in temporary situations when approved by the Site Construction Manager

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and the Authorized Officer. The lower end of grade dips shall be shaped to adequately drain away from the roadway.

4.4 Removal of Obstructions

4.4.1 Removal of trees, limbs, brush, and other obstructions will be limited to those that hang over the roadway obstructing the driver's sight distance, or within 14 feet of vertical clearance above the roadway.

4.4.2 Limbing will be accomplished by use of pruning saws, power saws, nippers, bow saws, or crosscuts. Limbs will be pruned flush with the trunk of the tree, except for portions of overhanging limbs. Use of axes for limbing will be prohibited. Material removed will be scattered outside the road prism. Piling and burning will not

be permitted unless otherwise provided for in Section 2.

4.4.3 Cattleguards crossed by construction vehicles and personnel shall be cleaned of all material to a depth of 2 feet below the grids prior to the start of construction and after the completion of construction activity on that section of line.

5.0 Helicopter Access

Helicopter construction and access, if required, shall be used in areas where the natural terrain, habitat, or other conditions preclude the use of conventional construction equipment. Construction of new access roads in these areas shall not be allowed except as approved by the Authorized Officer.

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SECTION 5: VISUAL RESOURCES

1.0 Purpose

To provide mitigation for sensitive visual resources affected by the construction of the (name of project).

2.0 Objective

To minimize the permanent modification of sensitive visual resources due to project-related activities.

3.0 Mitigation Measures

3.1 Specific mitigation measures for disturbed visual resources have been developed in accordance with the appropriate land man-

agement agency's recommendations for those areas adversely impacted by the (name of project). The environmental statement process has identified areas of visual sensitivity. Mitigation recommendations may include: (1) painting or "dulling" of structures; (2) selective use of non-specular conductor (electrical transmission lines); (3) restoration of right-of-way following construction; (4) access road preparation; and (5) varying clearing widths by feathering or undulating right-of-way boundaries.

3.2 The BLM and FS have determined the specific mitigation measures required. These specific mitigation measures, in addition to Sections 2, 3, and 4, respectively, for affected sections of the (name of project) are included in Appendix A, Exhibit 1 of this COM Plan.

(Note: A visual resource mitigation plan can be completed and appended to the COM Plan or the mitigation can be included in Section 5.)



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SECTION 6: FLAGGING

1.0 Purpose

To provide flagging stipulations that shall be in effect during construction of the (name of project) on FS or BLM rights-of-way.

2.0 Objective

To provide for the orderly identification of a wide variety of proposed activities in the field using colored plastic ribbon or paint.

3.0 Color Code

Colors of plastic flagging shall be used for the purposes shown in Table A-4.

TABLE A-4
USE OF COLORED PLASTIC FLAGGING^{1,2}

No.	Purpose	Color
3.1	Construction sites storage sites, borrow areas, staging areas, heliports, construction camps, batch plants, etc.	Orange
3.2	Transmission line/pipeline center line	Blue
3.3	Transmission line center line at tower	Fluorescent Orange Sites
3.4	Edge of right-of-way and/or reference stakes	Yellow
3.5	Danger trees	Red Paint
3.6	Cultural resource sites	Blue-and-White Striped
3.7	Changes by authorized officer	Red-and-White Striped
3.8	Road center line	Red

¹3.11 The Authorized Officer and Site Construction Manager shall assign additional flagging requirements as needed.

²3.12 All flagging shall be removed immediately after construction is completed.



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SECTION 7: RADIO COMMUNICATIONS

1.0 Purpose

To provide a reliable radio communication between the Grant/Permit Holder and BLM/FS for maximum safety to life and property through operational coordination during the construction of the (name of project). This communication plan outlines the agreement between BLM/FS and the Grant/Permit Holder for methods of communication to be used during construction of the (name of project) and the associated facilities on BLM/FS lands.

2.0 Conditions for Use of Equipment

The Grant/Permit Holder, BLM, and FS hereby agree upon the use of the Grant/Permit Holder's radio facilities and frequencies for the (name of project). These may be used by BLM/FS representatives for the duration of the project construction, when they are available, subject to the following conditions:

2.1 Grant/Permit Holder has the sole right to control the mobile radio units. BLM/FS operators shall operate the radio units subject to the instructions of the Site Construction Manager.

2.2 The operation of all mobile units shall be in accordance with the Federal Communications Commission's (FCC's) rules, regulations, and operating procedures.

2.3 The radio units, facilities, and frequencies are the exclusive property of the Grant/Permit Holder.

2.4 Only qualified persons authorized by the Grant/Permit Holder shall service and maintain the radio units.

2.5 BLM/FS will use the Grant/Permit Holder's radio units, facilities, and frequencies to provide contact and coordination with the Grant/Permit Holder's field representatives on this construction project.

2.6 (Number) radios shall be required for BLM/FS's use on this project.

2.7 Telephone numbers and radio unit numbers will be furnished prior to the initiation of construction.

3.0 Contractor Communications

Communication between the Contractor and Construction Manager shall be maintained via mobile radio units furnished by the Contractor. The mobile units, facilities, and frequencies shall remain the exclusive property of the Contractor.

The first part of the paper discusses the importance of the study. It highlights the need for a comprehensive understanding of the subject matter. The second part of the paper describes the methodology used in the study. It details the data collection process and the analysis techniques employed. The third part of the paper presents the results of the study. It shows that the findings are consistent with the hypotheses. The fourth part of the paper discusses the implications of the study. It suggests that the results have significant implications for the field. The fifth part of the paper concludes the study. It summarizes the main findings and suggests areas for future research.

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SECTION 8: CULTURAL AND PALEONTOLOGICAL RESOURCES

1.0 Introduction

The execution of cultural and paleontological resource identification and evaluation studies is legally mandated on projects conducted on national forest and public lands. Such studies include archeology, ethnography, and paleontology and are required under one or more of the following:

- The Statutes of Executive Order 11593
- The National Historic Preservation Act of 1966
- The National Environmental Policy Act of 1970
- The Federal Land Policy and Management Act of 1976
- The Archeological Resources Protection Act of 1979

In accordance with these regulations, cultural and paleontological resources must be given full consideration on projects conducted on national forest and public lands. Activities are allowed on these lands only when adequate means of identification and preservation of the cultural and paleontological resources are demonstrated. These cultural resource measures will apply to all facilities constructed in conjunction with the (name of project).

2.0 Purpose

The cultural and paleontological resource measures included in this COM Plan supplement the work done during the EA/EIS process. These measures further outline those actions to be taken for identification and protection of archeological and paleontological resources and ethnographical concerns found within the transmission line/pipeline and access road rights-of-way prior to and during construction on land administered by the BLM or FS.

3.0 Survey

3.1 Archeological Resources

A BLM limited Class I (literature search) and a complete Class III (100-percent intensive inventory) archeological resources survey will be performed on the (name of project) right-

of-way corridor, as well as on the total width of the granted right-of-way, under terms of a contract between (name of contractor for cultural resources) and (name of right-of-way holder). In addition, all roads constructed outside of the right-of-way will require a Class III survey. The results of these surveys will be reported and referenced in Appendix A, Exhibit 2. Recommended mitigation measures for known sensitive sites encountered during construction are included in Appendix A, Exhibit 2.

(Note: The cultural resource report is not included in the COM Plan. Due to the confidential nature of the information, the report would have limited distribution. The mitigation measures are included, either as narrative in Section 8 or as an appendix to the COM Plan.)

3.2 Paleontological Resources

Paleontological resources will also be examined on the (name of project) right-of-way corridor. A BLM limited Class I (literature search) and a Class III inventory of those areas identified as being potentially sensitive must be conducted under terms of a contract between (name of Cultural Resource Contractor) and (name of Holder). In addition, all roads constructed outside of the right-of-way will require a Class III survey. The results of this survey will be reported and referenced in Appendix A, Exhibit 2 of this COM Plan. Mitigation procedures to be followed during construction on sites of known potential sensitivity are included in Appendix A.

(Note: See note above for 3.1.)

3.3 Ethnographic Resources

Ethnographic (Native American) studies have been conducted for the (name of project) traversing (name of states crossed). The purpose of the studies is to: (1) determine which Native American groups traditionally use the area through which the (name of project) is to be constructed; (2) determine what value these groups place on cultural resources potentially disturbed by the construction of the (name of project) and associated structures; and (3) convey their recommendations for the mitigation of these impacts. The results of these studies will be reported and referenced in Appendix A, Exhibit 2. The Native American concerns have been included in the archeological mitigation procedures developed for affected sections of the (name of project) corridor.

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(Note: See note above for 3.1.)

4.0 Mitigation Measures

4.1 Cultural Resources

Recommended mitigation measures for the known cultural resources recorded along the (no. of feet) wide right-of-way are listed in Appendix A, Exhibit 2. The potential for archeological or paleontological manifestations may exist in the (name of project) right-of-way. The Contractor shall at all times exercise due care and precautions in his construction activities relating to this potential.

(Note: See note above for 3.1.)

4.2 Resources Encountered

If any additional cultural resource values are encountered during construction, construction activities will be halted in the vicinity of the site; the BLM/FS will determine their significance and determine an appropriate course of action. The BLM/FS shall also be responsible for coordinating any actions with the Grant/Permit Holder and the State Historic Preservation Office (SHPO). The construction operations shall avoid the site until an investigation can be made to determine the potential of the find. The Site Construction Manager will notify the Contractor that the following mitigative actions will be implemented where appropriate should cultural resource sites be encountered during construction.

4.2.1 Avoidance: Avoidance and, thus, preservation of any cultural resources encountered during construction of the (name of project) is the most desirable procedure and is recommended possible.

4.2.2 Physical Maintenance or Protection: Due to the types of cultural resources identified along the (name of project) and access road right-of-way

(see reports referenced under Appendix A, Exhibit 2), specific protection of sites (e.g., fencing or stabilization) is (or is not) a viable option. One protective measure that can be implemented is a policy directive to employees to avoid known site locations directly affected by project activities (see Section 6, Flagging).

4.2.3 Scientific Investigation: Scientific investigation involves some level of intensive surface collection and/or sub-surface testing or excavation. In the event that avoidance or protection of cultural resources identified during construction cannot be accomplished, data retrieval should be initiated. The BLM/FS will make a determination as to the significance of any cultural resources discovered and determine an appropriate course of action (see Section 2).

5.0 Procedures

5.1 The potential for archeological or paleontological manifestations may exist in the (name of project) right-of-way. The Contractor shall at all times exercise due care and precautions in his construction activities relating to this potential.

5.2 If an archeological site or paleontological locality is discovered, the Contractor shall immediately notify the Site Construction Manager so that proper identification can be made of the site and proper salvage techniques may be implemented. The Site Construction Manager will immediately notify the Authorized Officer.

5.3 The construction operations shall avoid the site until an investigation can be made to determine the potential of the find. Provisions for this procedure are detailed in Section 2.

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SECTION 9: THREATENED AND ENDANGERED PLANTS AND ANIMALS

1.0 Introduction

Threatened and endangered (T&E) plant and animal studies are required as a result of the Federal Endangered Species Act of 1973 (PL 93-205). The Act provides for active data collection on T&E plant and animal species which occur on Federal lands. In accordance with the Act, activities are allowed on Federal lands only when such activities incorporate adequate means of identification and protection of T&E plant and animal species.

These T&E plant and animal studies supplement the work done during the EA/EIS process and are summarized in Appendix A, Exhibits 3 and 4 of this COM Plan. The appropriate mitigation measures outline those actions to be taken prior to and during construction for the identification and protection of T&E plant and animal species located within the (name of project) right-of-way.

(Note: The detailed T&E plant and animal studies can be summarized, with the summary placed in an appendix of the COM Plan. These studies are confidential and will have limited distribution.)

2.0 Regulation Compliance

2.1 T&E Plants

To fulfill requirements of the Endangered Species Act of 1973 for plant life in the project area, the Grant/Permit Holder has provided the BLM/FS with an approved botanist to examine potential T&E plant habitats occurring within the (name of project) corridor and its associated facilities on Federal lands. The results of these studies will be reported and referenced in Appendix A, Exhibit 3.

(Note: See note above for 1.0.)

2.2 T&E Animals

To fulfill requirements of the Endangered Species Act of 1973 for wildlife in the project

area, the Grant/Permit Holder has provided a BLM- or FS-approved wildlife biologist to examine potential T&E animals existing within the (name of project) corridor and its associated facilities on Federal lands. The results of these studies can be found in the reports referenced in Appendix A, Exhibit 4.

(Note: See note above for 1.0.)

3.0 Mitigation Measures

3.1 T&E Plants

Survey results indicate that conflicts between certain T&E plant species and project construction may be unavoidable within the (name of project) right-of-way. If avoidance is not feasible, then mitigation measures taken may include the presence of a qualified botanist to monitor construction activities and/or the impacted plant species be made known to local botanic gardens for their consideration relative to possible transplanting of such specimens. These concerns and mitigation recommendations are listed in Appendix A, Exhibit 3 of this COM Plan.

(Note: See note above for 1.0.)

3.2 T&E Animals

Based on information contained in the T&E animals report, a wildlife mitigation plan has been prepared by the Grant/Permit Holder in conjunction with the Authorized Officer and the U.S. Fish and Wildlife Service (USFWS). The plan outlines the measures to be taken by the Contractor to minimize disturbance to wildlife in the area of the (name of project) facilities.

Where restrictions on the timing of construction are listed as wildlife mitigation measures, the appropriate state wildlife agency may give a written recommendation to waive this restriction in designated right-of-way sections, depending on habitat conditions and wildlife movement. After receiving written notice of the recommendation, the BLM/FS may allow construction during the previously restricted time periods.

APPENDIX A

SECTION 10: BLASTING

1.0 Purpose

The purpose of the blasting provisions is to provide an encompassing plan for the use and storage of blasting materials.

2.0 General Provisions

- 2.1 Fuses shall not be used for blasting.
- 2.2 Explosive cords shall not be used without written permission of the land management agency. The agency may specify conditions under which such explosives may be used, precautions to be taken, and similar measures.
- 2.3 If blasting operations are required adjacent to highways, a matting of some type shall be necessary in order to prevent flying debris from reaching the highway.
- 2.4 Explosive materials shall not be stored on Federal land without prior written permission from the BLM/FS.
- 2.5 During Fire Condition Class 4, a watchman equipped with a long-handled, round-pointed Size No. 0 or larger shovel and a filled 5-gallon backpack pump shall stay at the blast location for 1 hour after blasting is done. Blasting will not be permitted within the right-of-way during Fire Manning Class 5 and area closures (see Section 1).

3.0 Procedures

- 3.1 All blasting operations shall be carried out under and conform with the guidelines outlined in the latest edition of the 175th Anniversary Edition of the Blaster's Handbook.

3.2 The blasting procedure shall be divided into three parts: non-water blasting; storage requirements; and in-water blasting, if required.

3.3 The Contractor shall develop and prepare a blasting plan for submittal to the appropriate Federal and State agencies for approval. This plan will become part of the COM Plan by amendment.

3.4 No blasting operations shall be undertaken until approval of Federal and State agencies has been obtained.

3.5 Where necessary to protect surrounding property, each charge shall be matted to prevent flying debris. If blasting is properly done, matting will not be required in most non-populated areas; however, the Contractor shall respect the wishes of the landowner or the agency having jurisdiction.

3.6 Blasting will be very closely managed by the Site Construction Manager and Authorized Officer and performed in a manner that will protect live springs, reservoirs or water wells, pipelines, dwellings, recreation trails, roads, highways, recreation site developments, and other improvements. The Holder's Contractor shall employ an individual qualified and knowledgeable in the use of explosives. Charges shall be limited to the minimum required for reasonable removal of material by excavating equipment after the blasting. Safety to construction personnel and the public will be insured during any blasting operation, with ingress to any blasting area limited to only authorized personnel by the Contractor. The Authorized Officer will be notified prior to any blasting.



SECTION 11: HEALTH AND SAFETY

1.0 Purpose

To provide a health and safety program during the construction and maintenance of the (name of project).

2.0 Solid Waste Control

2.1 Purpose

The purpose of solid waste control is to provide procedures for the removal and disposal of solid wastes (i.e., garbage, timber, undergrowth, etc.).

2.2 Definitions

2.2.1 "Waste" as used herein means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, and equipment.

2.2.2 "Vegetation" means vegetative material from marketable timber, non-marketable timber, understory, and ground cover.

2.3 Provisions

Solid waste control includes procedures for removal of all wastes.

2.3.1 All construction-generated waste shall be removed or disposed from Federal land. If any waste is dumped on Federal land, the material shall be removed and the area restored. If necessary, contaminated ground shall be excavated, disposed of as directed by the Authorized Officer, replaced with suitable fill material, and compacted and restored to original condition by the Contractor.

2.3.2 There shall be no release of crank case oil, etc., into streams or soil by the Contractor.

2.3.3 Waste concrete and washout from concrete trucks will be disposed of at the batch plant site or a place satisfactory to the Authorized Officer.

2.3.4 All noncombustible wastes such as ceramic or metal scraps will be hauled away by the Contractor.

2.3.5 The Contractor will follow a litter policing schedule on all roads associated with the project as approved by the Authorized Officer.

2.3.6 Garbage shall be collected as it is generated and properly contained for disposal in an approved landfill operation.

2.3.7 The construction sites will be kept free from accumulation of waste materials and rubbish resulting from construction activities as required for safety, appearance, and avoidance of fire hazards.

2.3.8 Rock will be dispersed at the site or removed and disposed of as directed by the Authorized Officer.

2.3.9 Human wastes will be collected in portable toilets. Portable toilets will be located at equipment staging and storage yards located on Federal lands. The portable toilets will be emptied at an appropriate frequency and disposed of in an appropriate manner at a State-approved site.

3.0 Oil and Gas Spills

3.1 Purpose

The purpose of these spill provisions is to provide comprehensive procedures to be used in the event of an oil or gas spill.

3.2 Regulations

Regulations concerning oil and gas spills are found in Title 40 of the Code of Federal Regulations (CFR), Part 112.

3.3 Procedures

3.3.1 The major impetus of the oil and gas spill provisions is prevention. The Contractor shall inspect all tanks, valves, fittings, etc., to determine conditions and required maintenance.

3.3.2 If storage tanks are required by the Contractor, a containment system (e.g. dikes large enough to contain 1 ¼ times the storage capacity) shall be used. The dikes will have a minimum top width of 1 ½ feet and the wall slope will be 1:1 or less. Dikes will be provided with drainage controls to allow for controlled drainage of collected material. Accumulations of liquid hydrocarbons and rainwater containing liquid hydrocarbons will be removed and disposed of in accordance with approved practices. Valves will be provided with small dikes of sufficient size to contain temporary leaking at the valve. Locations of storage tanks will be approved by the Authorized Officer.

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3.3.3 Vehicles transporting gas and/or oil will carry a shovel or other implement to contain a small spill. Dirt will be spread on the surface of the spill to reduce the velocity of the flow. If possible, absorbent materials will be used. Oil-soaked soil will be removed and placed in an authorized landfill.

3.3.4 On-site maintenance of construction equipment or vehicles will not release gas or oil on or off the right-of-way. All gas or oil substances will be drained into containers and disposed of in an approved site and manner satisfactory to the Authorized Officer.

3.3.5 Procedures for Large Oil and Gas Spills

3.3.5.1 If the spill is of such magnitude that the Contractor cannot contain it, the Authorized Officer may call a State agency, etc., for assistance. Actions to be taken will be in compliance with the appropriate state's latest oil and hazardous spills directory.

3.3.5.2 In the event an oil or gas spill enters or has the imminent potential for entering a flowing stream, the Contractor shall notify the proper state offices and the Site Construction Manager. The Authorized Officer will be immediately notified by the Site Construction Manager and all steps possible will be taken to contain and clean up the spill. Containment of oil and gas spills in waterways will include, but will not be limited to, use of a natural absorbent (i.e., hay or an industrial absorbent).

3.3.5.3 The Site Construction Manager will submit written reports for all oil and gas spills to pertinent State and Federal agencies. Reports will include, but not be limited to:

- (1) Location.
- (2) Name, title, and telephone number of person reporting the spill.
- (3) Time and date of spill.
- (4) Material spilled.
- (5) Estimated quantity and area affected.
- (6) Action taken for containment and cleanup.

(7) Water body involved.

(8) Special circumstances, if any.

4.0 Pesticides, Herbicides, and Other Chemical Controls

This section will not apply to transmission line construction, as none will be used during construction. (Future maintenance and operation plans may be developed and approved by the Authorized Officer, if required.)

5.0 Emergency Response

5.1 Purpose

The purpose of these emergency response provisions is to expedite the reporting of emergencies and needed follow-up measures and activities. As used herein, emergencies shall apply to personal injuries and property damage.

5.2 Definitions

5.2.1 Personal injuries as used herein shall be defined as those requiring services other than first aid treatment and transportation to medical facilities under private vehicle.

5.3 Procedures

5.3.1 Emergency procedures for wild fire protection shall be as outlined in Section 1.

5.3.2 In case of personal injury, first aid treatment and procedures shall be initiated to determine extent and nature of injury. If emergency medical services are required, the use of the communication system outlined in Section 7 shall be used to notify the Contractor's field office and request ambulance service and other appropriate help.

5.3.3 Accidents involving property damage needing emergency measures shall be reported to the Contractor's field office and the Site Construction Manager by the use of the communications system outlined in Section 7. After notification, procedures shall be instituted to prevent further damage.

5.3.4 A written report shall be prepared by the Contractor giving all pertinent information and copies to the Site Construction Manager. In case of personal

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injuries, accident forms shall be filed with the appropriate authority having jurisdiction.

6.0 Traffic Control

6.1 Purpose

The purpose of these traffic control stipulations is to provide for the safety of project workers and the general public in their use of highways and roads crossing Federal lands.

6.2 Provisions

6.2.1 Provide and place appropriate temporary guards, signs, bridges, lights, and other signals as necessary for public safety, where required by the BLM/FS.

6.2.2 The Contractor shall exercise due caution and care when operating to prevent undue conflict with public use of the roads.

6.2.3 A reflectorized "Slow Moving" vehicle emblem shall be attached to all slow-moving equipment.

6.2.4 The Contractor shall place signs with flags at either end of areas being worked to warn road users of work in progress. Signs shall meet the requirements of the "Manual on Uniform Traffic Control Devices." Signs shall be posted only when machinery is operating and shall not precede machinery by more than ½ mile.

6.2.5 Where construction activities occur at or near major road crossings that could create an unsafe condition, the Contractor will employ the use of a flagman in addition to warning signs to control traffic and/or warn of possible danger.

7.0 Air Quality Control

7.1 Purpose

The purpose of the air quality control measures is to provide a program designed to minimize air emissions and to maintain the quality of air resources in a condition as free from air pollution as is practical.

7.2 Procedure

Air pollution resulting from project construction will occur from fugitive emissions and any allowed open burning. The air quality control procedure consists of two types: the

first type applies to the minimizing and suppressing of fugitive emissions, and the second type concerns rules for open burning.

7.3 Fugitive Emissions

7.3.1 Construction of the (name of project) and related facilities will cause a temporary increase in fugitive dust, especially in the more arid and cultivated areas. The amount of dust caused by construction will vary according to climatic conditions; for example, if precipitation and/or frozen ground are encountered during construction, dust levels will be reduced; if strong winds and little precipitation occur, fugitive dust levels will increase. Ambient levels of nitrogen oxides, hydrocarbons, and carbon monoxide near the construction zone will increase due to emissions from heavy construction equipment. These emissions will be temporary and will decrease as construction crews move on.

7.3.2 The Contractor shall not handle materials, nor store, use a road, construct, alter, or repair any equipment to be operated, without taking reasonable precautions to prevent particulate matter from becoming airborne and creating nuisance conditions. Such precautions will include the following methods:

7.3.2.1 Use, where necessary, fresh water for control of dust in the construction, operation, grading of roads, or clearing of land and right-of-way.

7.3.2.2 Apply fresh water on unpaved roads, material stockpiles, and other surfaces which can create airborne dusts.

7.3.2.3 Enclose, fully or partially, material stockpiles in cases where application of fresh water is not sufficient to prevent particulate matter from becoming airborne.

7.3.2.4 Mat consolidated rock blasting operations where required (see Section 1).

7.3.2.5 Cover open-bodied trucks transporting materials likely to become airborne when in motion.

7.3.2.6 Remove promptly from paved roads earth or other materials which may become airborne.

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7.3.2.7 Prevent excessive exhaust emissions from vehicles and heavy equipment by proper maintenance.

7.4 Open Burning

7.4.1 The use of open burning as a method of right-of-way construction waste disposal will be employed only when such burning is absolutely necessary and no other practicable waste disposal alternative is available (see Section I). Burning of other materials will not be permitted.

7.4.2 Open burning in violation of any rule, regulation, or order shall be extinguished by the person in attendance or person responsible when notified to extinguish the fire. Any open fires shall be constantly attended by a responsible person until extinguished. All combustible material to be open burned shall be dried to prevent emissions of excessive smoke and stacked or windrowed to eliminate dirt, rocks, and other noncombustible material and to promote efficient burning. Equipment and tools shall be available to periodically re-stack the burning material to ensure that combustion is essentially complete and that smoldering fires are prevented.

7.4.3 No open burning which creates any of the following shall be allowed: (1) a private nuisance; (2) a public nuisance; or (3) a hazard to public safety.

7.4.4 Any waste materials that normally emit dense smoke, noxious odors, or tend to create a public nuisance shall not be burned.

7.4.5 Before igniting any open fire, approval shall be obtained from the Authorized Officer and the Site Construction Manager. In addition, the following will be notified:

7.4.5.1 The local administrative unit.

8.0 Safety Policies and Program

8.1 Purpose

The purpose of these policies and program is to provide minimum requirements that shall be followed by the Contractor during construction operations. It is intended to provide for the safety and welfare of contractor employees, Grant/Permit holder personnel, and the general public.

8.2 Plan

8.2.1 The Contractor shall be solely responsible for initiating, implementing, maintaining, and supervising all safety precautions and programs in connection with construction. This shall include employee safety training and prompt elimination of all unsafe physical and/or mechanical conditions. The Contractor shall take any precaution necessary to ensure the safety of all exposed personnel and property.

8.2.2 The Contractor shall have an established safety program and methods of implementing the program during the construction of the (name of project).

8.2.3 Safety procedures and programs shall be equal to or better than those prescribed by the Occupational Safety and Health Administration and State and local agencies having jurisdiction.

8.2.4 The Contractor shall provide training or require that his employees are knowledgeable and proficient in procedures involving emergency situations and first aid fundamentals.

8.2.5 The BLM/FS requires as minimum standards the transmission line construction safety practices as outlined in the Bureau of Reclamation publications *Power System Safety Standards* (1978) and *Construction Safety Standards* (1979). The construction Contractor shall comply with applicable sections of these standards during construction.

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SECTION 12: WATER QUALITY

1.0 Purpose

The purpose of the river, stream, and floodplain crossing procedure is to provide guidelines on techniques for the crossing of waterways.

2.0 General Requirements

2.1 The Contractor shall comply with the Federal regulations concerning the crossing of waterways as listed in Title 33 of the CFR, Part 323.

2.2 Design clearances over all navigable waterways shall be in accordance with the requirements of the U.S. Army Corps of Engineers, Rural Electrification Administration (REA), and National Electric Safety Code, whichever is more stringent.

2.3 Before beginning construction activities requiring crossing of waterways, the Contractor shall obtain all necessary permits.

2.4 Blasting, use of heavy equipment, and other construction activities within 500 feet of springs will be carried out as directed by the Site Construction Manager and Authorized Officer.

3.0 Electrical Transmission Lines

3.1 Measures

3.1.1 Construction activities for the (name of project) will occur outside of waterways, and the Contractor's activities shall be limited to access only.

3.1.2 Construction activities shall be forbidden on or near the banks of waterways.

3.1.3 Temporary access roads and permanent access roads crossing waterways shall be in accordance with Section 3.

3.1.4 Crossing of waterways that cannot be forded shall be limited to conductor stringing operations. The crossing by means of a pulling line can be accomplished by the use of a boat or helicopter.

3.1.5 The natural meander of the streams shall not be altered.

3.1.6 No water diversion structures shall be used.

3.1.7 In all wetland areas containing surface water at the time of construction, care shall be taken to assure as little

disturbance as possible to these areas. The Contractor's procedures shall be approved by the Authorized Officer.

3.1.8 Construction of the project will not result in a water temperature change, alteration of the physical/chemical nature of the water body, or interference with aquifer development.

4.0 Pipelines

4.1 River, Stream, and Floodplain Crossing Procedures

4.1.1 The construction techniques used to cross rivers and streams along the pipeline route will vary according to the characteristics of the different rivers and streams. (This section discusses only pipeline routes; however, it can be modified to fit electrical transmission rights-of-way.) The techniques include: (1) clam, bucket, or backhoe operations; (2) trenching operations; (3) dry streambed operations; (4) boring operations; and (5) floodplain crossings.

Table A-5 lists individual river, stream, and floodplain crossings, with milepost markers and suggested crossing techniques.

4.1.2 Before beginning construction at any river crossing, the Holder will obtain all necessary permits. The working schedule (Table A-6) will be followed as closely as possible to minimize environmental impacts to aquatic life. (Include figures on cross sections for each river crossing.)

4.1.3 (Number of) fish-rearing areas or overwintering areas have been identified in the vicinity of the pipeline crossings. (Name species) spawning beds have been identified within (number of miles) miles downstream of the crossing of (name of stream). Sediment control structures may be constructed to intercept sediment at these crossings if deemed necessary by appropriate Federal and State agency personnel at the time of construction.

4.1.4 Clam, Bucket, or Backhoe Operations

4.1.4.1 A clam, bucket, or backhoe operating from one or both banks will trench through the stream. Material will be removed from the trench and stored on the bank above high water line.

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TABLE A-5

Individual River, Stream, or Floodplain Crossings

Spread No. _____

Watercourse	Pipeline Milepost	Construction Technique ¹
-------------	-------------------	-------------------------------------

¹ *Construction Technique*

- A - Backhoe, etc. Operations
- B - Trenching Operations
- C - Dry Streambed Operations
- D - Boring Operations

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TABLE A-6
**Working Schedule in Environmentally Sensitive Rivers,
Streams, and Wetlands**

[illegible]

¹ As determined by FS, BLM, and State Fish & Wildlife personnel.

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4.1.4.2 In slow-moving, low-gradient streams, the material will be placed on the downstream side of the trench and dragged back into the trench after the pipe is installed.

4.1.4.3 After placement of the pipe in the ditch, the fill material stockpiled on the bank will be used to backfill the trench (Figure A-2).

4.1.5 Trenching Operations

4.1.5.1 Trenching will begin at the bank of the river or stream and move into the river to continue trenching across the river. The excavated material will be stockpiled on the bank until the bank is out of reach of the equipment arm. At this point, excavated material will be placed in the streambed on the downstream side of the trench. As the bank becomes in reach of the equipment arm, excavated material will be stockpiled on the opposite bank. After the pipe is installed in the ditch, material stockpiled in the streambed will be dragged into the trench, and material stored on the banks will be replaced in the trench.

4.1.6 Dry Streambed Operations

4.1.6.1 Dry streambeds will be crossed using standard dry land ditching techniques. Backhoes or ditching machines will dig a trench across the dry streambed, the pipe will be welded and placed into the ditch, and the excavated material will be used to backfill the trench.

4.1.6.2 The pipeline will be buried with at least 5 feet of cover using all of the above construction techniques.

4.1.7 Boring Operations

4.1.7.1 The (name of river or stream) crossing will be made boring horizontally beneath the riverbed. A special drilling rig will drill at angles up to 30 degrees from the horizontal along a predetermined profile under the river to the surface at the opposite bank. Installation depths under the river channel will range from approximately 30 feet of cover under the center of the channel to approximately 10 feet of cover within 100 feet of each bank.

4.1.8 Floodplain Crossing

4.1.8.1 To allow for possible flooding at river crossings, the pipe "sag" will begin at least 20 feet back of the high bank at all crossings. Based on previous experience, this technique should prevent the pipe from washing out at the river or stream edges.

4.1.8.2 Construction equipment will operate from wooden mats in any floodplain area which has surface water at the time of construction.

4.1.8.3 Pipe at all river, stream, and floodplain crossings will be either weighted by concrete anchors or coated with concrete to prevent the pipe from rising to the surface.

4.1.9 Chemical Changes

4.1.9.1 Construction of the project will not result in water temperature change, alteration of the physical/chemical nature of the water body, or interference with aquifer development. The natural meander of the streams will not be restructured. No water diversion structures will be used to construct the crossings.

4.1.10 Additional Construction Space

4.1.10.1 Additional construction space for the maneuvering of equipment and stockpiling of material will be required at larger river crossings. Table A-7 lists these crossings and the amount of space required. At these areas, the river banks will be cut down to form a low angle ramp, and the required areas cleared. After construction, the streambanks and construction areas will be restored as closely as possible to their preconstruction contour, stabilized where necessary, and/or revegetated to prevent erosion.

4.1.10.2 To reduce the amount of excess sedimentation, temporary bridges will be used at all Class I stream crossings for the passage of heavy construction equipment. Slopes of cuts through streambanks will be designed and constructed to minimize erosion and prevent slides. Other methods of minimizing erosion and

APPENDIX A

EXAMPLE ONLY

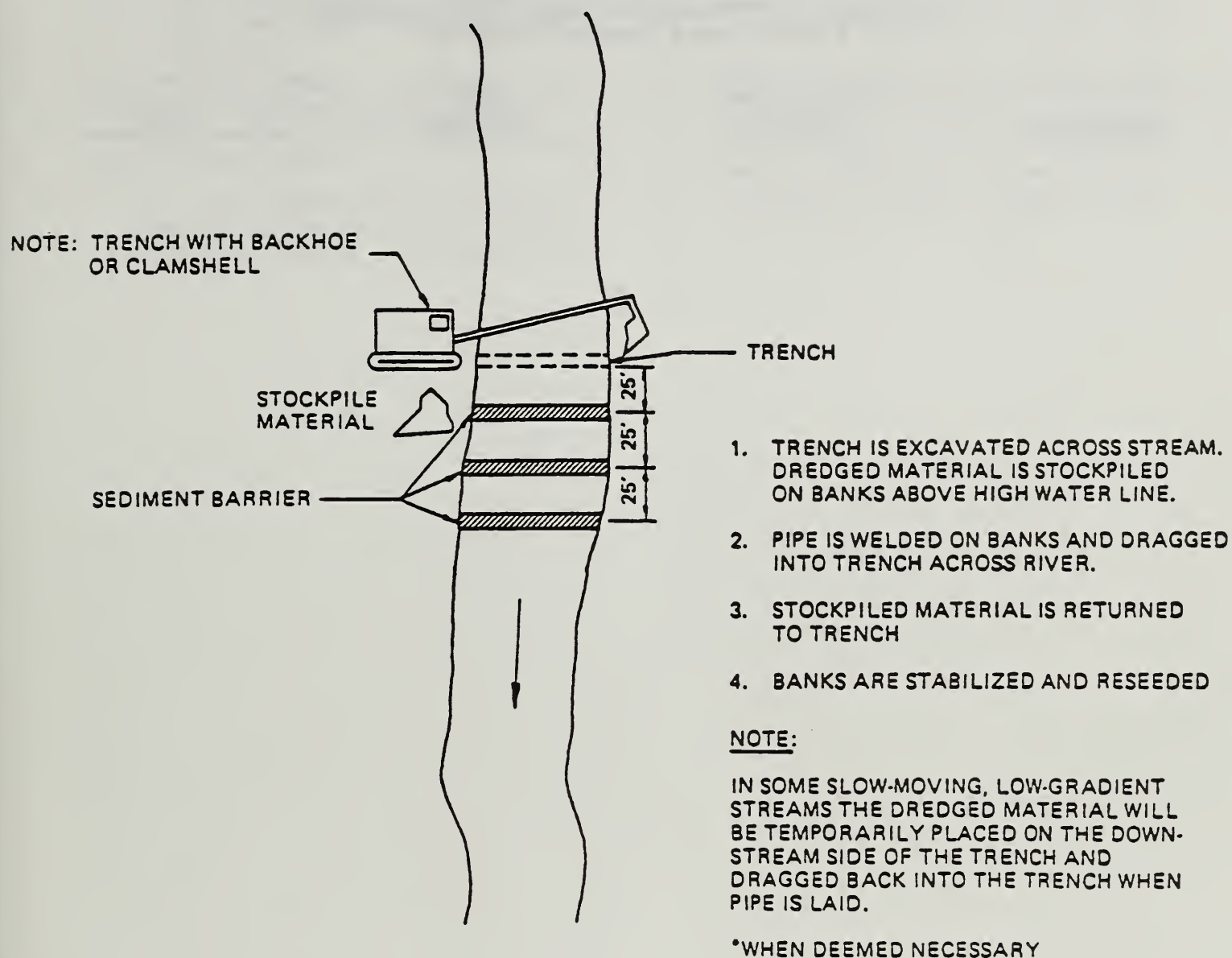


FIGURE A-2
Typical River Crossing Construction

APPENDIX A

TABLE A-7
Temporary Construction Space Requirements
For River and Stream Crossings

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sedimentation at stream crossings are discussed in Section 3, Erosion Control, Revegetation, and Restoration Measures.

4.2 Wetlands Crossing Procedure (this manual discusses only pipelines; however, text can be modified to fit electrical transmission rights-of-way).

4.2.1 In all wetland areas containing surface water at the time of construction, construction vehicles will operate from

wooden mats to prevent surface disturbance. Care will be taken to assure as little disturbance as possible to wetland areas.

4.2.2 Following is a list of areas where the ground is known to become saturated during certain portions of the year (Table A-8). At these areas, the pipe will either be weighed with large concrete blocks or coated with concrete to prevent the pipe from floating to the surface.

TABLE A-8
Possible Wetland Areas

70

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SECTION 13: SITE PRESCRIPTION

on Federal lands. This site prescription method will be similar to those prepared for electrical transmission lines.

1.0 Purpose

1.1 Electrical Transmission Lines

1.1.1 The site prescription is a mini development and rehabilitation plan for a very small part of a large right-of-way, such as a power transmission line tower site or a maintenance or storage yard.

1.2 Pipelines

1.2.1 The site prescription is a development and rehabilitation plan for a segment of the linear right-of-way where resource values and concerns are the same or similar. Each segment will be covered by a separate site prescription; segments will be delineated by mile posts.

1.2.2 A site prescription will also be prepared for construction sites (e.g., storage areas, batch plants, double jointing yards, etc.) when these sites are located

2.0 OBJECTIVE

To protect and restore critical sites and disturbed rights-of-way during and after construction.

3.0 Procedure

The following site prescription forms are examples of a power transmission line tower prescription and pipeline right-of-way prescription. The Contractor shall abide by the provisions in the completed site prescription forms and conduct his construction operation accordingly.

The site prescription forms shall be completed and approved by an authorized representative of the BLM/FS and right-of-way Holder. All site prescription forms will be completed prior to approval of the COM Plan. No construction will begin at a tower site or along a segment of pipeline right-of-way until a site prescription form has been completed and approved for that site.

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ELECTRICAL TRANSMISSION LINE TOWER SITE OR CONSTRUCTION SITE PRESCRIPTION

Ownership: BLM () FS ()

Date Prepared:

District:

Date Amended:

Tower Number:

Division

Station Number:

T___ R___

Type of Tower: Line Tower () Angle Tower ()

Construction Site:

Division:

Station Number:

T___ R___

Type of Terrain:

Type of Soil:

Type of Vegetation:

Construction Method	Helicopter	Surface Grading Allowed	No Grading Allowed
---------------------	------------	-------------------------	--------------------

Footing

Erection

Conductor

SITE SKETCH

Station	200' (Construction ROW)	Station
---------	-------------------------	---------

To: (Destination)
----->

LEGEND



Construction area: Grading not to exceed _____ sq. ft. in this area



Area where no grading is allowed

+ Tower or construction site center

APPENDIX A

TOWER SITE OR CONSTRUCTION SITE PRESCRIPTION

Construction Stipulations: (Circle Appropriate Numbers)

1. No clearing allowed
2. Trees to be saved will be flagged
3. Stockpile cleared vegetation
4. Strip and stockpile topsoil in areas to be graded

Rehabilitation Stipulations: (Circle Appropriate Numbers)

1. Rip and scarify all disturbed areas including graded areas to a 12-inch depth
2. Restore natural contours and stockpiled topsoil to all graded areas
3. Revegetate all disturbed areas using seed packet number
4. Scatter stockpiled cleared vegetation on all revegetated areas
5. Abandon temporary access road
6. No counterpoise allowed

Additional Stipulations:

APPROVAL SIGNATURES OF FINAL PRESCRIPTION

Holder's Authorized Representative

Date

BLM/FS

Date

APPENDIX A

PIPELINE RIGHT-OF-WAY OR CONSTRUCTION SITE PRESCRIPTION

Ownership: BLM () FS ()

Date Prepared:

District:

Date Amended:

Segment:

Division

Mile Posts:

T__ R__

Construction Site:

Division:

Station Number:

T__ R__

Type of Terrain:

Type of Soil:

Type of Vegetation:

Construction Method

SITE SKETCH

Station	100' (Construction ROW)	Station
---------	-------------------------	---------

To: (Destination)
----->

LEGEND



Construction area: Grading not to exceed _____ sq. ft. in this area



Area where no grading is allowed

+ Construction site center

APPENDIX A

PIPELINE RIGHT-OF-WAY OR SITE PRESCRIPTION

ROW Clearing and Construction Stipulations: (Circle Appropriate Numbers)

1. Clearing limited to widths shown on right-of-way sketch
2. Vegetation to be saved will be delineated with flagging
3. Stockpile cleared vegetation
4. Preserve topsoil through double ditching procedure
5. See attached list for other required mitigation

Rehabilitation Stipulations: (Circle Appropriate Numbers)

1. Rip and scarify all disturbed areas including graded areas to a 12-inch depth
2. Restore natural contours and stockpiled topsoil to all graded areas
3. Revegetate all disturbed areas using seed packet number
4. Scatter stockpiled cleared vegetation on all revegetated areas
5. Abandon temporary access road(s)
6. See attached list for other required mitigation

Additional Stipulations:

APPROVAL SIGNATURES OF FINAL PRESCRIPTION

Holder's Authorized Representative

Date

BLM/FS

Date

EXHIBIT 1

VISUAL RESOURCE PROTECTION

1.0 Compliance

1.1 Electrical Transmission Lines

The use of non-specular conductor and non-reflective towers as specific mitigation measures is prescribed under general terms in-

cluded in the right-of-way grant for Federal lands administered by the BLM and the special use permit governing lands administered by the FS. These visual resource protection measures will be conducted in addition to the provisions of Sections 2, 3, and 4 of this COM Plan.

1.1.1 Visual Resource Mitigation

Non-Specular Conductor

STATE _____ LOCATION _____ LENGTH (MILES) _____

1.1.2 Visual Resource Mitigation

Non-Reflective Towers

STATE _____ LOCATION _____ NUMBER OF TOWERS _____

EXHIBIT 2

CULTURAL AND PALEONTOLOGICAL RESOURCE MITIGATION PROCEDURES

INTRODUCTION

Studies for certain sections of the (project name) have not been completed at this time. Only completed sections are currently addressed in Exhibit 2. Upon completion of additional line sections, revisions to Exhibit 2 will be submitted for review and approval.

1.0 GENERAL PROCEDURES

The following general procedures will be performed:

1. Contractor and subcontractor employees will be required to strictly observe laws regarding antiquities, including surface collection. Employees will be made aware of the laws and penalties for not strictly observing them; they will be made aware of the procedures discussed in Section 8 regarding the discovery of cultural resources during construction activities.
2. Any vandal activity will be reported to the Authorized Officer.
3. The right-of-way Holder will provide approved archeologists and paleontologists during ground-breaking construction activities along the right-of-way for the areas indicated below.
4. Archeological and paleontological resource sites encountered during ground-breaking construction activities will be recorded and procedures developed to appropriately and legally mitigate adverse effects resulting from project implementation.
5. Systematic surface collection and/or salvage of cultural and paleontological resource sites which are encountered and cannot be avoided will be arranged through the Holder's Environmental Consultant listed below.
6. The right-of-way Holder's environmental consultant's address is:

2.0 ARCHEOLOGICAL AND HISTORICAL RESOURCES

2.1 Utah Section -- _____ Generating Station to _____ Divisions

Specific mitigation measures will be required in these divisions. See Appendix B, Exhibit 1, Article 2 for mitigation procedures.

DIVISIONS

No mitigation required during construction.

Monitoring Areas

Archeological and historical resource monitoring areas are included in Appendix B, Exhibit 1, Article 2.1.3.

3.0 PALEONTOLOGICAL RESOURCES

3.1 Utah Section -- _____ Generating Station _____ Divisions

Monitoring will be required in some areas. See Appendix B, Exhibit 1, Article 5.0 for areas to be monitored.

DIVISIONS

No monitoring expected during construction.

EXHIBIT 3

SUMMARY OF PLANT LIFE AND MITIGATION MEASURES

1.0 COMPLIANCE

For the sections listed below, T&E Plant Inventory and Significance Evaluation Reports (see references) have been submitted and their recommendations accepted by the appropriate Federal land management agency. For sensitive botanical resources identified along the _____ foot-wide right-of-way, procedures have been developed to approximately and legally mitigate adverse effects resulting from project implementation.

2.0 T&E BOTANICAL RESOURCES

_____ SECTION

_____ RIGHT-OF-WAY

_____ DIVISIONS

No mitigation required during construction.

ACCESS ROADS LOCATED OUTSIDE THE _____
FOOT RIGHT-OF-WAY

No such areas were identified that warranted performing botanical resources inventory and significance evaluation.

_____ SECTION

_____ RIGHT-OF-WAY

_____ DIVISIONS

See Appendix B, Exhibit 2, Article 3.1 for mitigation during construction.

_____ SECTION

_____ RIGHT-OF-WAY

_____ DIVISIONS

Ecological resource clearance studies will need to be conducted in these divisions.

EXHIBIT 4

SUMMARY OF T&E WILDLIFE

SPECIES AND MITIGATION MEASURES

1.0 COMPLIANCE

For the sections listed below, T&E Wildlife Inventory and Significance Evaluation Reports have been submitted and their recommendations accepted by the appropriate Federal land management agency. For sensitive wildlife identified along the ____-foot-wide right-of-way, procedures have been developed to appropriately mitigate adverse effects resulting from project implementation. Mitigation procedures will also be included on the site prescription forms for the affected area.

2.0 T&E WILDLIFE

____ SECTION

____ DIVISIONS

No mitigation required during construction.

____ SECTION

1. The Holder will be required to provide an experienced biologist during new road construction, right-of-way site clearing, and construction site clearing within the following areas:

Division (Mile Posts or Stations): List mitigation measures for the section and division.

- a.
- b.
- c.

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
RESEARCH REPORT NO. 1000

1. *Introduction*

2. *Experimental*

3. *Results and Discussion*

4. *Conclusions*

5. *References*

6. *Appendix*

APPENDIX B

SAMPLE RIGHT-OF-WAY MANAGEMENT PLAN FOR HIGH VOLTAGE ELECTRICAL TRANSMISSION LINES AND FOR GAS AND OIL PIPELINES ON FEDERAL LANDS

1.0 PURPOSE

These right-of-way management measures outline the activities to be taken following construction of the (name of project) so that the right-of-way is managed according to Bureau of Land Management (BLM) and Forest Service (FS) guidelines and land use plans. The Right-of-Way Management Plan is concerned with the management of surface lands associated with the right-of-way in conjunction with routine operation and maintenance of the (name of project).

2.0 MEASURES

These right-of-way management measures are developed for managing the ground surface after all construction mitigating measures have been applied. Surface management includes normal day-to-day activities that take place on BLM- and FS-administered land, and should not be confused with physical operation and maintenance of the transmission line/pipeline. The normal management activities will be handled by the appropriate BLM and FS offices. The right-of-way Holder becomes involved in surface management when maintenance or restoration and mitigation measures are needed, changes in the right-of-way are proposed that would involve surface-disturbing activities, or when maintenance work is necessary work on the right-of-way.

3.0 RESPONSIBILITY

3.1 Right-of Way Holder

Following construction, the right-of-way Holder will be responsible for maintaining the appearance of the right-of-way. The Holder will notify the appropriate FS or BLM office of any proposed changes in the right-of-way facilities or of any proposed surface-disturbing activities. The BLM/FS Authorized Officer will authorize any surface-disturbing activities. If surface-disturbing activities occur, the Holder will be responsible for mitigation as outlined in the use permit, the right-of-way Grant and this Construction, Operation, and Maintenance (COM) Plan.

3.2 Federal Land Management Agency

Following construction, the BLM and FS will incorporate the right-of-way into the normal activities of the area. This will include livestock grazing, wildlife, possibly other rights-of-way, recreation, and other activities as needed. The BLM and FS will be responsible for granting other permits for using the right-of-way area and for ensuring that uses are consistent with the BLM's and FS's land use plans. The FS and BLM will consult with the right-of-way Holder before allowing any activities that could interfere with the operation and maintenance of the transmission line/pipeline. Any modifications to the right-of-way by the Holder will be approved by the BLM or FS office having jurisdiction prior to any ground-disturbing activities.

4.0 TRANSMISSION LINE/ PIPELINE SURVEILLANCE AND MAINTENANCE

Operation and maintenance of the (name of project) will be consistent with the management of the right-of-way as specified herein. Maintenance activities on the (name of project) and associated facilities will generally consist of periodical inspections by the Holder according to the performance of the various facilities. The maintenance of the (name of project) may require the pruning and/or removal of vegetation that poses a hazard. Noxious weeds will be controlled. These activities will be conducted in accordance with stipulations set forth in the COM Plan, the Special Use Permits (FS), and the right-of-way Grant (BLM).

4.1 Electrical Transmission Lines

The environmental guidelines found in the booklet entitled *Environmental Criteria for Electrical Transmission Systems*, published by the United States Department of Agriculture (USDA) and Department of the Interior (USDI), and *Electric Power Transmission and the Environment*, published by the Federal Communication Commission (FCC) (now Department of Energy), will be followed in determining the right-of-way clearing and line

APPENDIX B

maintenance procedures. Once the line is installed, the right-of-way Holder will patrol the transmission line periodically by fixed-wing aircraft, helicopter, vehicle, or on foot. Line maintenance will vary from routine inspections to emergency repairs required to restore line service. The maintenance crews will trim the trees and vegetation where necessary and remove any obstacles within the right-of-way as required to prevent accidental grounding contact with the conductors. Should the use of herbicides be necessary, only USDA- or USDI-recommended and Environmental Protection Agency (EPA)-approved herbicides be used. In most areas accepted standard utility practices such as repeated tree trimming will be followed to maintain the right-of-way. These activities would be coordinated with the local BLM district or FS area having jurisdiction prior to their initiation.

The transmission lines will be maintained using the same types of equipment used during construction. The Authorized Officer will be notified prior to initiating routine maintenance work and will provide guidance on resource protection measures.

4.2 Pipelines

The requirements of Title 49, Part 192, Code of Federal Regulations (CFR), *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*, will be followed in determining the right-of-way clearing and line maintenance procedures. Once the pipeline is installed, the right-of-way Holder will patrol the pipeline periodically by fixed-wing aircraft, helicopter, or on foot. Line maintenance will vary from routine inspections to emergency repairs required to restore gas service.

The maintenance crews will trim and cut trees and vegetation where necessary, and remove any obstacles within the right-of-way as required to prevent damage to the pipeline. Should the use of herbicides be necessary, only USDA- or USDI-recommended and EPA-approved herbicides be used. In most areas accepted standard natural gas pipeline practices will be followed to maintain the right-of-way. These activities would be coordinated with the local BLM district or FS area having jurisdiction prior to their initiation. The pipeline will be maintained using the same types of equipment used during construction. The Authorized Officer will be notified prior to initiating

routine maintenance work and will provide guidance on resource protection measures.

5.0 PESTICIDE AND HERBICIDE USE

5.1 Purpose

These pesticides and herbicide use measures will supplement the site-specific practices and mitigation measures and outline measures to be followed during maintenance of the (name of project) right-of-way should the use of chemicals be necessary on lands managed by the FS and BLM.

5.2 Measures

Should the use of biochemicals be necessary, only USDA- or USDI-recommended and EPA-approved chemicals be used. These substances will never be used on the banks of streams or where runoff will wash the chemicals directly into a stream. Herbicides, oil, and other chemicals will not be stored or disposed of in such a way as to allow drainage into surface or underground waters or into areas where harm could be inflicted on wildlife, domestic animals, plants, or man. These substances will not be permanently stored on Federal lands.

The use of chemicals such as herbicides, fungicides, and fertilizers will comply with State and Federal laws, regulations, and policy concerning the use of poisonous, hazardous, or persistent substances. State and Federal wildlife agencies will be contacted if application of any of these substances is on or near sensitive wildlife areas. Application of these substances will be by ground methods.

Prior to the use of such substances on or near the right-of-way Grant or Special Use Permit areas, the right-of-way Holder will obtain approval of a written plan for such use from the local BLM district or FS area having jurisdiction. The plan will outline the kind of chemical, methods of application, purpose of application, and other information as required. All use of pesticides, herbicides, and other substances on or near the right-of-way shall be in accordance with the approved plan and all control regulations for such substances.

APPENDIX C

SAMPLE PLAN VIEW LEGEND

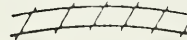
FOR COM PLAN AND PROFILE

The symbols, figures, and lettering on the following legend are examples of what should be shown and placed on the plan and profile sheets accompanying the COM Plan. Actual legend items will be specified by the land management agencies.


APPENDIX C

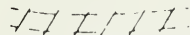
ROADS:

 **PERMANENT - NO CONSTRUCTION REQUIRED P-NCR**

 **PERMANENT - CONSTRUCTION REQUIRED P-CR**

 **OVERLAND TRAVEL O-T**


 **TEMPORARY - NO CONSTRUCTION REQUIRED T-NCR**

 **TEMPORARY - CONSTRUCTION REQUIRED T-CR**

CONSTRUCTION AREAS:

 **STRUCTURE SITE AND CRANE LANDING BOUNDARIES**

 **ASSEMBLY SITE BOUNDARY**

 **PULL SITE BOUNDARY**

NOTE: ALL STRUCTURE SITES, CRANE LANDINGS, ASSEMBLY SITES, AND PULL SITES WILL HAVE SELECTIVE CLEARING

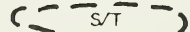
 **ROADLESS CONSTRUCTION BOUNDARY**

 **BORROW AREA**

 **SOD REMOVAL AND RESTORATION**

 **BATCH PLANT - STORAGE AREA**

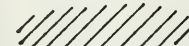
CLEARING TYPE:


 **SELECTIVE TOPPING**


 **SELECTIVE CLEARING**

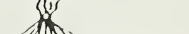
 **PATCH CUTTING**

DISPOSAL AREAS:

 **CHIP DISPOSAL**

 **LOG AND SCATTER DISPOSAL**

 **FIRE WOOD**

 **BURNING**

OTHER:

 **LANDSCAPE BOUNDARY**

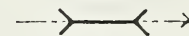
 **CENTERLINE OF ALIGNMENT**


4384+00 345-KV FL. STATION NUMBER AND


130/4 STRUCTURE NUMBER

DRAINAGE STRUCTURES:

 **ROCK CROSSING**

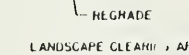
 **CULVERT**

 **BRIDGE**

 **CONCRETE CROSSING**

 **WATER BAR REQUIRED**

 **REGRADE ROAD SECTION**

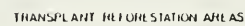
 **LANDSCAPE CLEARING AREAS:**

85% REMOVAL

75% REMOVAL

85% REMOVAL



 **TRANSPLANT RESTORATION AREAS**

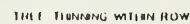
 **THICKET THINNING WITHIN ROW**



FIGURE C-1

Sample Plan View Legend for COM Plan and Profile

APPENDIX D

SAMPLE OF ELECTRICAL TRANSMISSION AND CONSTRUCTION PIPELINE SEQUENCES

Figures D-1 through D-4 illustrate electrical transmission construction activities, handling equipment, and installation of conductors. Figure D-5 illustrates oil and gas pipeline construction sequences.

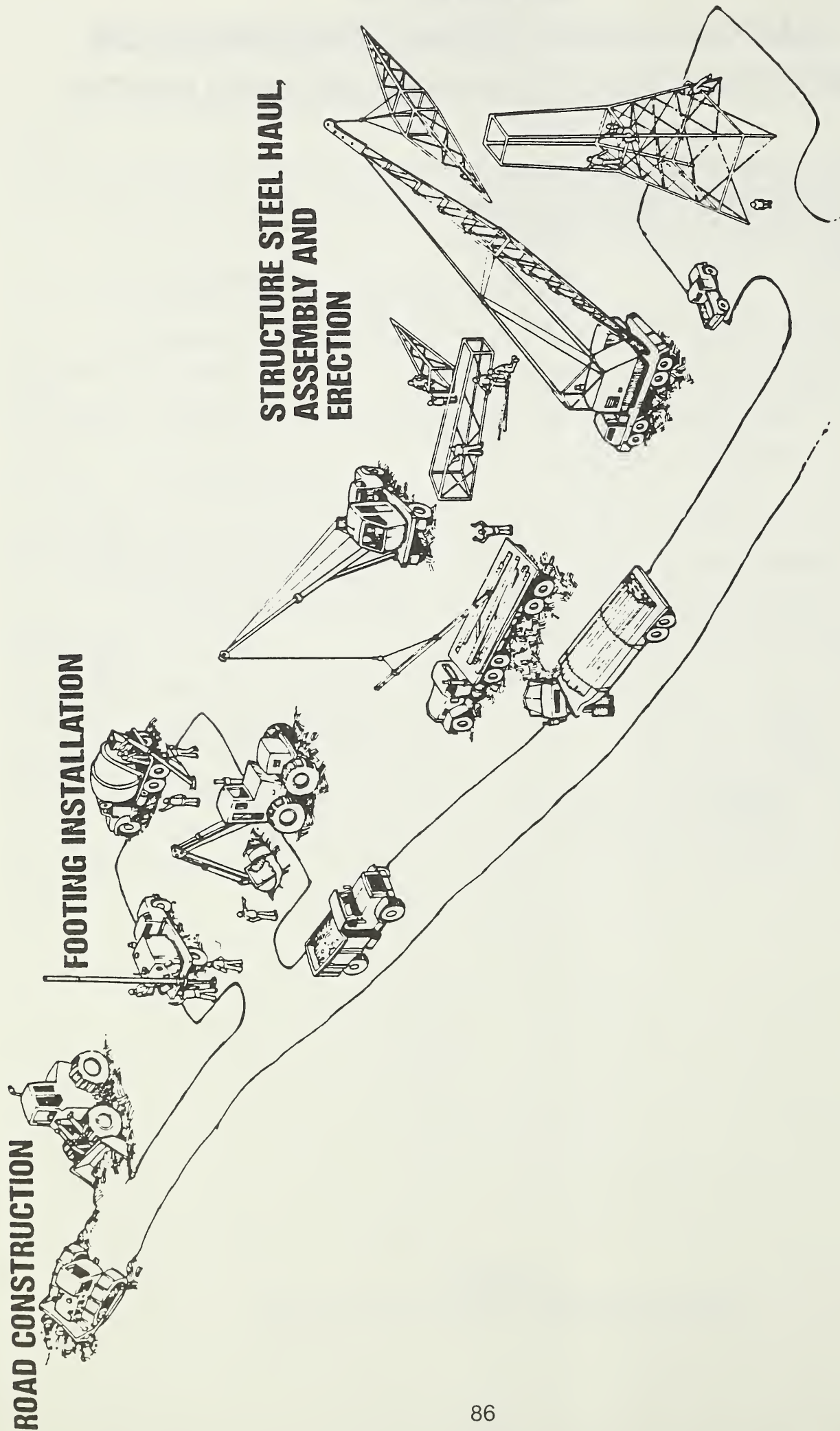


FIGURE D-1
Typical Transmission Line Construction Activities

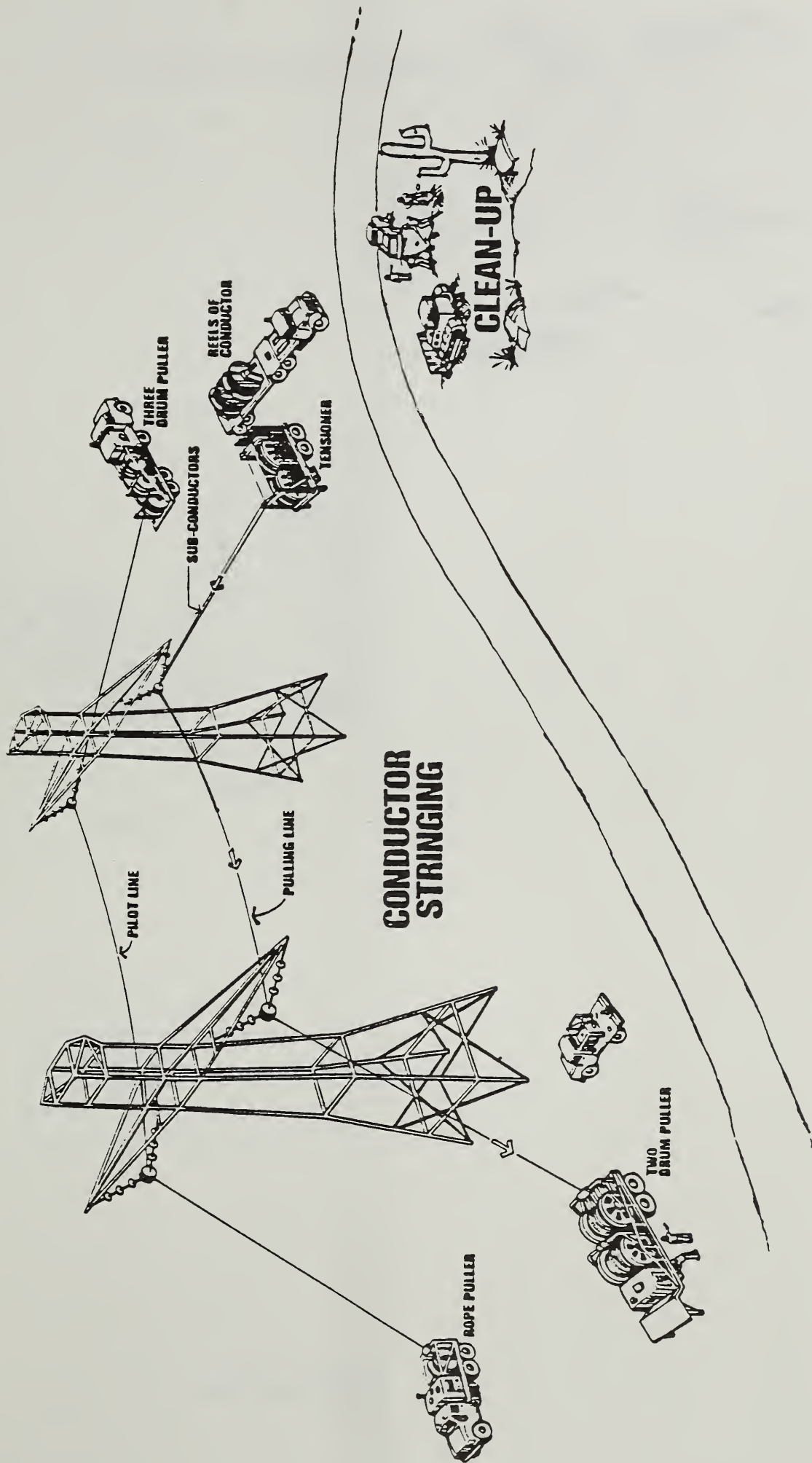
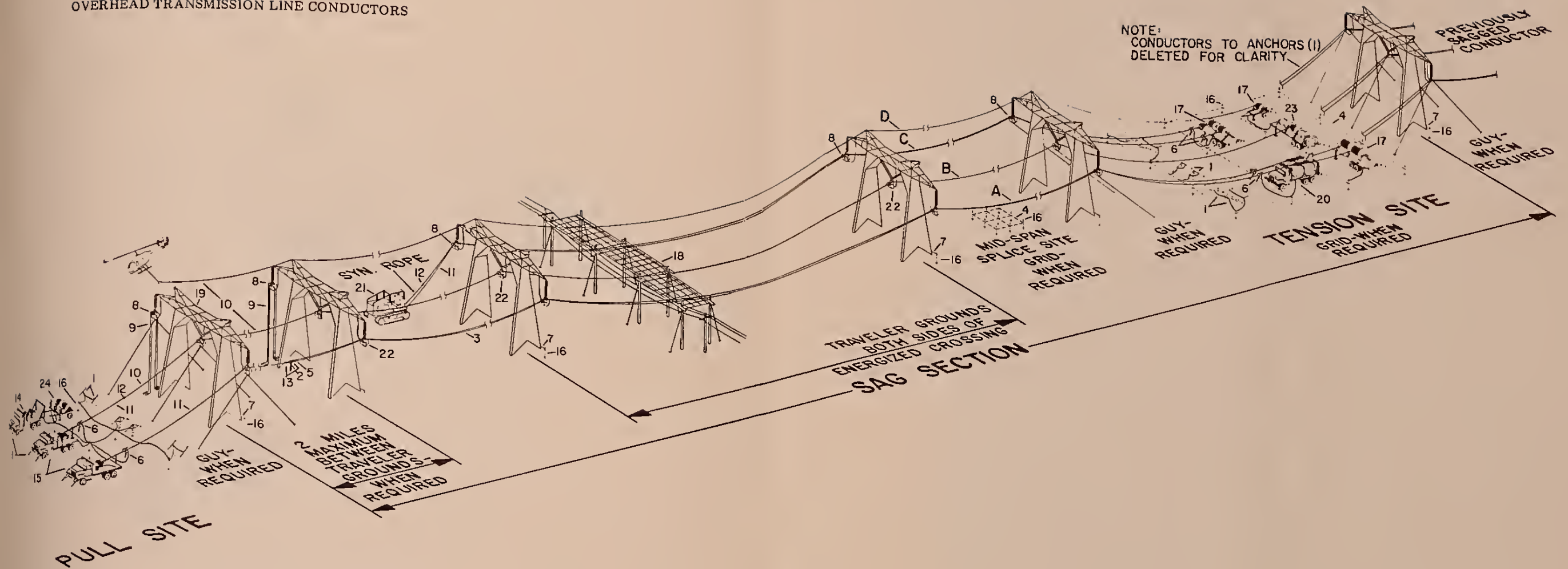


FIGURE D-2
Basic Wire-Handling Equipment

APPENDIX D

OVERHEAD TRANSMISSION LINE CONDUCTORS



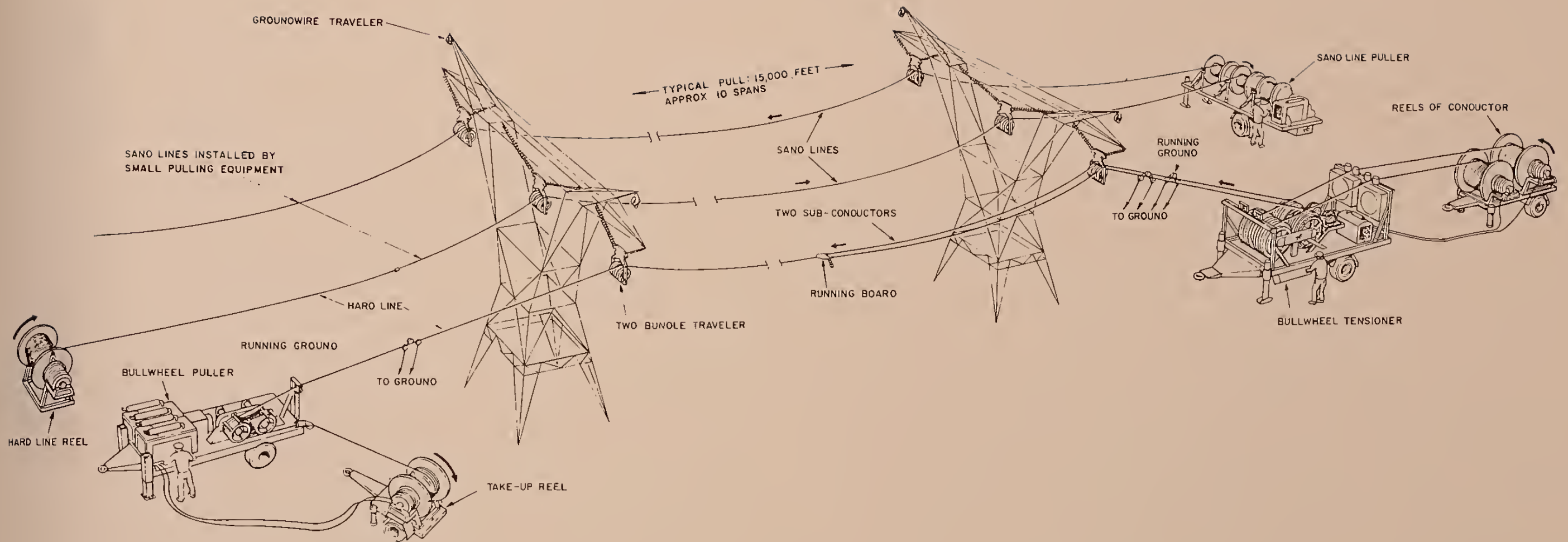
- | | | |
|---------------------------------|----------------------|-------------------------------|
| 1. Anchor (see 10.1.3) | 9. Finger line | 17. Reel stand |
| 2. Running board | 10. Pilot line | 18. Crossing structure |
| 3. Bundled conductor | 11. Pulling line | 19. Snub structure (see 10.2) |
| 4. Ground grid (see 5.5.5) | 12. Connector link | 20. Bullwheel tensioner |
| 5. Woven wire grip | 13. Swivel link | 21. Crawler tractor |
| 6. Running ground | 14. Bullwheel puller | 22. Traveler |
| 7. Structure base ground | 15. Drum puller | 23. Pilot line winder |
| 8. Traveler ground (see 10.2.3) | 16. Ground rod | 24. Reel winder |

- A. Typical stringing arrangement
 B. Typical pulling line installation with pilot line winder
 C. Typical installation of pulling lines with tractor and finger lines
 D. Typical installation of pilot lines with helicopter

FIGURE D-3

Installation of Overhead Transmission Line Conductors

APPENDIX D



NOTE:

±500 KV DC BIPOLAR WILL REQUIRE FOUR CONDUCTORS
VERSUS SIX SHOWN ABOVE FOR 500 KV AC.

FIGURE D-4
Typical Conductor Stringing Setup

APPENDIX D

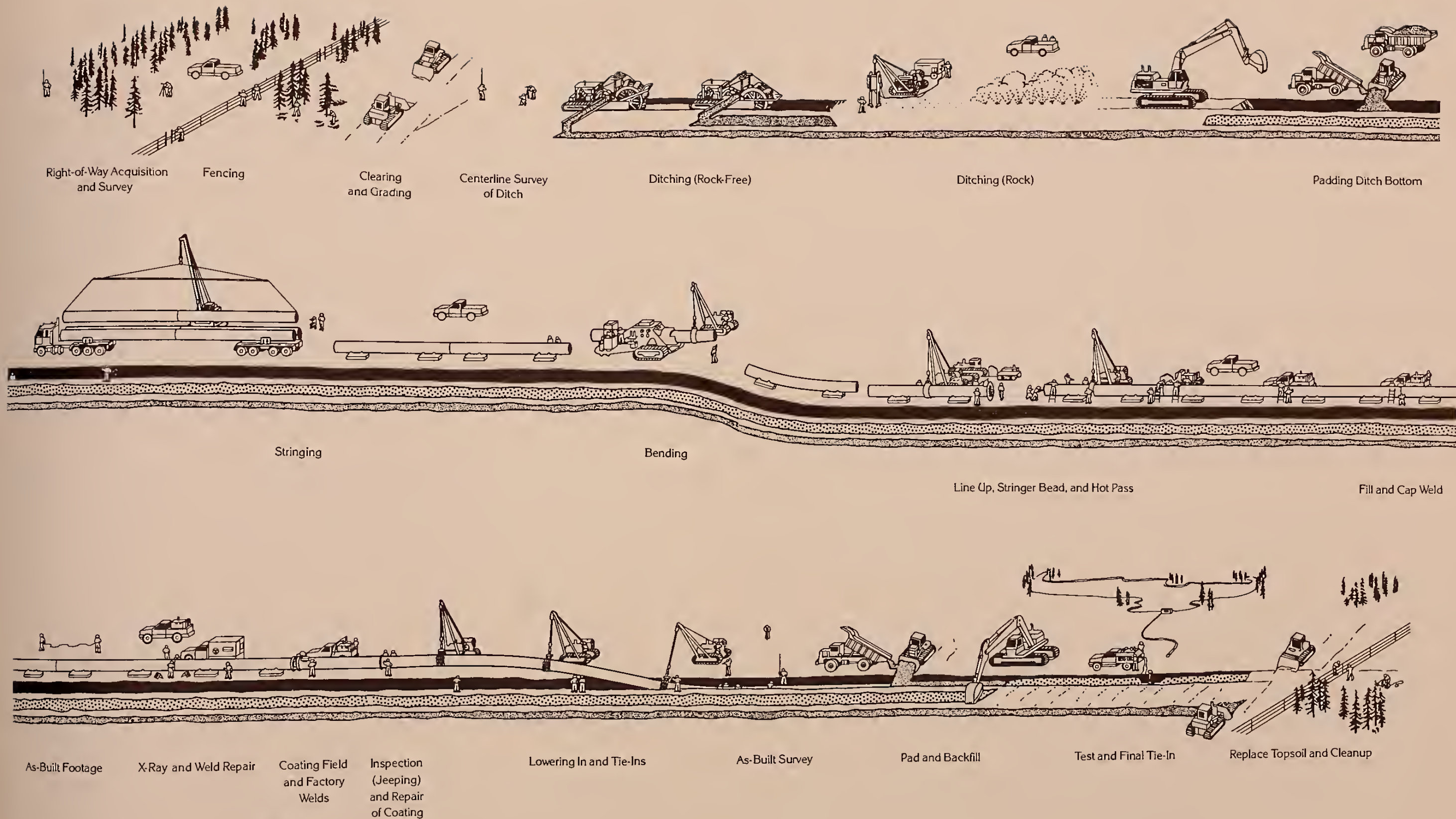


FIGURE D-5
PIPELINE CONSTRUCTION SEQUENCE



APPENDIX E

ADDITIONAL MITIGATION MEASURES

INTRODUCTION

This section describes measures to be implemented by the participants to mitigate any adverse environmental impacts resulting from transmission line and pipeline projects. Site-specific stipulations for construction on all lands would be included in the Construction, Operation, and Maintenance (COM) Plan. This COM Plan would include specific mitigation measures to insure preservation of environmentally sensitive areas and would ultimately become part of the grant of right-of-way and Authorizing Document issued by the Bureau of Land Management (BLM) and Forest Service (FS), respectively. The COM Plan will be included in the construction contract documents and will be binding on the construction Contractor.

In addition, the Council of Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] 1505.3) require that the lead agency provide for monitoring to insure that essential commitments are carried out and mitigation measures performed.

ELECTRICAL TRANSMISSION LINES

Certain of the following mitigation measures are also applicable to oil and gas pipeline projects.

General

- The design, construction, operation, and maintenance of the line would follow the applicable criteria set forth in the booklet entitled *Environmental Criteria for Electric Transmission Systems*, published jointly by the United States Department of Agriculture (USDA)/United States Department of the Interior (USDI); (2) *Management of Transmission Line Right-of-Way for Fish and Wildlife*, published by the U.S. Fish and Wildlife Service (USFWS); and (3) the *National Forest Landscape Management Handbook*, published by the USDA.
- Under authority of Section 504 of the Federal Land Policy and Management Act (FLPMA), the applicant would be required

to provide funding to the appropriate Federal agencies for the purpose of financing one or more specialists and their vehicles for administration of construction activities.

- Intensive on-site investigations would be conducted prior to initiation of construction activities. These would be joint investigations, involving applicant and authorizing agency representatives to designate areas for implementation of mitigation measures.

Geological Hazards

- A geologic survey and soils analysis would be completed and included in all proposed action considerations. Detailed geophysical and design investigations would be conducted to more accurately define unstable areas or faultline locations. Areas subject to mudflows, landslides, mudslides, avalanches, rock falls, and other types of mass movement would be avoided in locating linear facilities. Where such avoidance is not practical, the design, based upon detailed field investigations and analysis, would provide measures to prevent damage due to the occurrence of mass movement.
- Disturbed soil surfaces would be returned to the original grade or to a grade satisfactory to the owner or land manager.
- Permanent maintenance roads and temporary roads would be aligned and graded to conform with the natural landscape.
- Damage to permanent access roads during construction and maintenance would be repaired.
- Where possible, towers would not be located on unstable or potentially unstable slopes.
- Active fault areas and epicenters would be avoided if possible. Towers and substation structures would be designed and constructed in conformity with applicable engineering and building standards. Should it prove unavoidable to place a tower near an active fault, the tower location would be selected on the basis of its expected seismic response.

APPENDIX E

- Access roads would not be constructed in unstable areas.

Soils

- Restoration, rehabilitation, and soil stabilization measures would be developed jointly by the applicant and appropriate Federal agency. These measures would cover all restoration, rehabilitation, and soil stabilization needs for project areas other than transportation access systems addressed under measures for road access.
- No modification and reshaping earthwork (i.e., cuts and fills on construction roads, powerline corridors, or service facilities) would be made without approval of the authorizing agency.
- Removal and stockpiling of topsoil would be required at all construction sites. Such sites would be revegetated to prevent wind erosion and maintain soil integrity, unless otherwise directed by the appropriate Federal official. Along transmission lines, dozer, blade, or ripper-equipped tracked vehicles would not be allowed except for access road construction.
- Clearing and grading of construction storage and staging areas would be limited.
- Construction activities would be closely monitored to insure that soil disturbance and damage to vegetation were kept to a minimum.
- Construction activities during excessively muddy soil conditions would be restricted.
- Disturbance of steeply sloping areas and highly erodible soils identified by soil investigations during the design phase would be avoided as much as possible. Steeply sloping areas are defined as slopes greater than 35 percent.
- Where soil is exposed during construction, erosion would be minimized by filling in ruts, terracing, riprapping, diking, or spreading a straw mulch on the surface. Land management agencies and interested landowners would be consulted on revegetation and clean-up. Specific measures would be agreed upon after the centerline was located but before ground disturbance began.
- Construction of leveled earth equipment platforms for the use of cranes in the

assembly of structures would be allowed at the end of temporary spur roads. Only one platform per structure site would be used, unless otherwise authorized. If all-terrain cranes were utilized, equipment pads might not be necessary at all structure locations.

Water Resources

- Rivers, streams, and washes along linear facilities would be crossed at existing roads or bridges, except at locations designated by the appropriate Federal official. The applicant would be required to install culverts or bridges at points where new permanent access roads would cross live streams. This would be done to allow unobstructed fish passage. Where drainages would be crossed by temporary roads, dirt fills or culverts would be placed and removed upon completion of the project. Any construction activity in a perennial stream would be prohibited unless specifically allowed by the appropriate Federal official. All stream channels and washes would be returned to as near natural state as possible.
- Water which has been appropriated to Federal agencies or other users would not be used without written authorization from the appropriate Federal official or water right owner.
- Construction of new access roads near streambanks would be limited.
- Revegetation would be done and sediment control structures would be used to control erosion in accordance with the FS publication *Guides for Controlling Sediment From Secondary Logging Roads*.
- Streambanks would not be disturbed unnecessarily, and riparian vegetation would be left intact.
- Fill material would not be placed in streams or adjacent areas where excessive siltation could occur.
- Tower structures would be sited so that, to the extent practicable, they could be constructed and maintained without altering the stream or introducing sediments or contaminants into the water.
- Streams would be crossed by vehicles and construction equipment at existing crossings or with temporary facilities. Culverts would be used where necessary.

APPENDIX E

- Construction of access roads in and near river crossings would be in accordance with the requirements of the COE *Nation-wide General Permit for Utility Line Crossings* and as specified by the applicable permits and grants of rights-of-way issued by other agencies.
- Herbicides would not be used on the banks of streams or where runoff would wash the herbicides directly into a stream. The use of herbicides in substations would be in accordance with the label directions as required by the Federal Insecticide, Fungicide, and Rodenticide Act of 1972 and as recommended by the appropriate agency.
- Herbicides, oil, and other chemicals would not be stored or disposed of in such a way as to allow drainage into surface or underground waterways.
- Post-construction removal of debris would be performed in a manner to avoid adding contaminants to the water.
- Appropriate precautions against fire would be taken during construction and maintenance.
- Existing corridors and access roads would be used whenever practical to reduce potential impacts to undisturbed areas. Prior to designating access routes and staging areas, the appropriate landowner or land manager would be consulted.
- Clearing would be restricted as per requirement of the appropriate land management agency. Determination of a hazard on the right-of-way would be a joint responsibility of the applicant and the appropriate Federal official, consistent with the National Electric Safety Code and State or other electric safety requirements.
- Respective land management agencies and interested landowners would also be consulted during transmission line design, which includes transmission centerline alignment, tower location, pull sites, etc. The USDA/USDI publication, *Environmental Criteria for Electric Transmission Systems*, and the USDA publication, *National Forest Landscape Management Handbook*, would be followed to the extent practical during the design, construction, and maintenance of the transmission line.
- Disturbed land not committed for the life of the project would be allowed to return to its original state and revegetated according to Soil Conservation Service (SCS) recommendations or BLM, FS, State land manager, and landowner requirements.
- Riparian areas would be avoided or spanned wherever practicable.
- Existing trees in the right-of-way would be properly "feathered" to create curved undulating boundaries, while allowing for safe operation of the line.
- Maintenance personnel are normally expected to require entry on the right-of-way one to two times per year. More frequent entries could be required if operational problems occur on the line. In the event that soils or vegetation were damaged during emergencies or storms, restoration procedures would be the same as those employed during and after construction. During maintenance inspections, any problems with conductor clearance or soil erosion would be noted and corrected.

Vegetation

- Areas cleared of vegetation by construction or other activities associated with the project would be revegetated. The plant species and revegetation method used would vary according to situation and need. Successful re-establishment could necessitate subsequent seedlings and plantings for complete rehabilitation of disturbed sites. Where commercial timber was cut, the trees would be measured and commercially sold or disposed of. All revegetation, including disposal of cleared vegetation, would be under the direction of the appropriate Federal official, in consultation with the private landowner and/or respective State wildlife management agency.
- Trees in the right-of-way would be topped and selectively removed to provide for conductor safety.
- Trees removed during the right-of-way clearing would be disposed of by methods agreed to by individual landowners and by governmental agency requirements.
- Protection of vegetation would be given consideration throughout the planning and construction phases of the project. In wooded areas, tower structures would be sited to reduce the disturbance of trees, when possible.

APPENDIX E

- Public access to the right-of-way would be restricted according to landowner or land manager requests.
- The applicant would be required to provide for the control of noxious weeds as directed by the appropriate Federal official.
- Pesticides and herbicides would not be applied to the right-of-way. In and near substations, only chemicals recommended by the appropriate authorities, such as the USDA and USDI, would be employed. Chemicals would be applied in accordance with the Federal Insecticide, Fungicide and Rodenticide Act of 1972.

Wildlife

- All power transmission lines would be designed to prevent electrocution of raptors.
- Timing of construction activities would be planned in cooperation with land management and fish and wildlife agencies to minimize disturbances during the reproductive seasons of species such as mule deer, elk, and antelope. Special attention would be given to the months of (list time frame) to avoid disturbance to calving and fawning activities.
- Mule deer and elk migration areas and critical winter range would be identified and avoided during critical months. Critical winter months may include November through May. The exact avoidance period of critical winter areas would be specified during the right-of-way approval process.
- Human disturbance to wildlife within the right-of-way could be restricted by blocking or locking gates to right-of-way access roads as needed.
- Riparian vegetation and wetland areas would be avoided or spanned where practicable in accordance with Executive Order criteria.
- Waterfowl concentration areas would be avoided where practicable. Additionally, the transmission line would be designed to be as high above water surfaces as practicable.
- If it became apparent that a significant number of waterfowl or other birds were being killed or injured by striking the lines, it could be necessary to mitigate the impact by measures such as marking or flagging selected portions of the lines.

- Construction during hunting seasons would be evaluated on a site-specific basis. In those areas where hunting and construction activities would be incompatible, construction activities would be curtailed.

Wetlands and Riparian Areas

- Wetlands and riparian areas would be avoided where possible during the delineation of the right-of-way, centerline, tower locations, and substation facilities. Wetlands and riparian areas that could not be entirely avoided would be spanned without construction in the wetlands.
- Wetlands would be avoided during maintenance of the project.
- Construction of access roads would not be permitted in wetlands.
- Sediment control measures would be used as needed to protect wetlands and riparian areas.
- Riparian vegetation would not be removed, except tall trees that conflict with transmission line operation would be topped.
- Fill material would not be placed in wetlands.
- Any lubricating oils or fuel for equipment motors would be carefully handled and disposed.

Floodplains

- Floodplains would be avoided where possible. Those floodplains which could not be completely avoided would be spanned, without construction in the floodplain, if possible.
- Any tower structures that must be built in floodplains would be designed to withstand the 100-year flood (that flood with a 1-percent chance of occurring in any given year).
- Structures would be placed where the likelihood and severity of flooding is expected to be lowest.

Threatened and Endangered Species

- The applicant would provide funding for a botanist, approved by the appropriate Federal official, to survey for candidate, proposed, and officially listed threatened and endangered (T&E) species. The botanist would complete a 100-percent survey

APPENDIX E

of all areas to be disturbed and designate those areas in which no disturbance would be permitted. The botanist would be available, as needed, during the construction period.

- Regions within the study area where T&E plant species could occur would be identified and avoided to the extent practicable during corridor selection.
- During centerline location and prior to construction of access roads and substation facilities, a qualified botanist would inspect the right-of-way, access roads, and substation sites in those areas where Federally designated T&E plant species could occur to insure that these species would not be impacted. All such species would be avoided or, if recommended by the USFWS and land management agencies, transplanted prior to construction of the transmission and substation facilities.
- Timing of construction activities would be planned based on consultation with the appropriate agency to minimize disturbance to the reproductive seasons of sensitive species.
- Peregrine falcon and bald eagle nests and eagle roosting sites would be identified and avoided during critical months. Critical winter months might include November through May. The exact time frame might vary from year to year and in specific locations within the project area. Critical areas and periods during which they would be avoided by construction activities would be specified during the right-of-way approval process.
- Important bald eagle roost sites identified by the BLM, FS, Utah Division of Wildlife Resources (UDWR), and USFWS would be avoided.
- All conductors for the proposed line would be separated by at least (number) meters (number) feet. Since the eagle wing span ranges from 1.8-2.4 meters (6 to 8 feet), the proposed conductor spacing would (or would not) be adequate to prevent electrocution.

Cultural and Paleontological Resources

- Intensive archeological surveys and clearances would be required (as specified in BLM Manual 8111.14) for all project sites

(as specified in BLM Manual 8111.14) prior to new construction. Properties eligible for inclusion in the National Register of Historic Places (NRHP) would be identified in consultation with the State Historic Preservation Officer (SHPO) (as specified in 36 CFR 800.4 and 36 CFR 63). Wherever possible, sites would be avoided. Where avoidance was not possible, mitigation of adverse effects to sites eligible for the NRHP would be undertaken in compliance with 36 CFR 800. Sites discovered during construction or other activities authorized by the appropriate Federal official would be evaluated and managed as specified in 36 CFR 800. Memorandums of Understanding with the SHPO(s) regarding protection of cultural resources would be obtained.

- The applicant would provide a qualified paleontologist approved by the appropriate Federal official. The paleontologist would conduct an intensive survey of all areas to be disturbed which were identified as having high potential for significant paleontological resources. An approved paleontologist would be available, as needed, during surface disturbance. If the paleontologist determined that values would be disturbed, construction would be halted until appropriate action could be taken.
- Known historic and archeological resources listed or eligible for listing on the NRHP would be avoided.
- A cultural resource survey would be completed of the transmission line right-of-way and new and expanded substations. If sites listed or eligible for listing on the NRHP were discovered, no construction would be initiated until the procedures prescribed in the Advisory Council on Historic Preservation (ACHP) Regulation, 36 CFR 800, had been carried out.
- If construction should be contemplated outside the boundaries of the area surveyed, the additional area would be surveyed at that time. If any sites were found during construction, work would be stopped until authorities were notified and an archeologist could proceed to the site to make an appropriate assessment.

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Land Use

- The proposed transmission facilities would be constructed in compliance with all applicable Federal regulations to minimize interference with any existing transportation systems or to reduce hazard to airports or navigable airspace.
- All existing improvements (e.g., fences, pipelines, etc.) along project-related linear facilities (pipelines, transmission lines, etc.) would be protected, and damage due to construction would be repaired.
- All public land survey monuments, private property corners, and National Forest boundary monuments would be located, marked, and protected. In the event of destruction, these location monuments would be replaced.
- A transportation (i.e., access) plan would be submitted by the applicant for review and approval by the appropriate land management agency. This plan would cover approval of temporary, reconstructed, and newly constructed roads, and would indicate which roads would be necessary for long-term operation and maintenance needs. The plan would include clearing work, rehabilitation, and use associated with transportation needs. Overland access could be specified in lieu of road construction or reconstruction.
- Construction of facilities would not be allowed when in conflict with existing mining and drilling operations.
- Issuance of right-of-ways for project facilities would be subject to valid existing prior rights.
- Blasting would be prohibited within 500 feet of municipal water storage facilities, fluid transmission pipelines, gas or oil collection lines, or water and sewage lines.
- Blasting would be prohibited within 1,000 feet of all dwellings, churches, hospitals, schools, and nursing facilities, unless otherwise approved by the appropriate Federal official.
- Federal Aviation Administration (FAA) officials would be provided with design and centerline information to assure minimal impact to navigation. Hazard markers would be placed on lines where required.
- An exact determination of energy or mineral resource locations would be made when the transmission line right-of-way was identified. During the right-of-way approval process, any energy lease-transmission line conflicts would be resolved through consultations with all affected parties.
- Land management agencies and private landowners would be reimbursed for any commercial timber removed or damaged to young growth because of right-of-way clearing activities. Timber below commercial size would be paid for at current appraised value.
- In agricultural areas, the centerline would be located along property, section, and fence lines to minimize disturbance to agricultural lands, where practicable.
- All fences cut or damaged during construction would be repaired, and gates would be installed in fences to prevent livestock from escaping.
- Gates, rigid and braced (type to be determined with landowner input or land management agency requirements), would be installed in existing fences and locked per requirements established by the landowner or land management agency.
- Access roads that were no longer needed for operation and maintenance of the line would be reshaped and reseeded to discourage unauthorized use by the general public. The appropriate land management agency would determine which access roads were to be closed on Federal lands.
- In areas where the line must cross prime, important, or irrigated farmlands, the towers would be carefully located to minimize disturbances. Access roads and staging areas would, where possible, be located away from farmlands.
- The participants would work with interested and/or affected landowners to minimize impacts of the transmission line location.

Human Resources

- All trash, packing material, and other refuse would be removed from construction areas and salvaged or placed in approved sanitary landfills.

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- Construction-related travel would be restricted to approved access routes. Cross-country and ORV construction-related travel would not be permitted except as authorized by the appropriate Federal official.
- Consultation with local planning agencies on a continuing basis to establish the line route within the proposed corridor would minimize the impact to high density areas.
- Any easements required on private land would be based on negotiations with landowners.
- Appropriate approvals for line sections would be obtained prior to final centerline location and construction.
- To minimize the potential for impacts to recreation resources, project participants would coordinate with the appropriate administering agency in the identification of right-of-way centerlines and tower locations.
- Efforts would be made to locate the facilities in the least obtrusive and most environmentally compatible manner.

Visual Resources

- Prior to initiation of the construction phase, the applicant would secure the services of a landscape architect to prepare the design and mitigation requirements for the project. The design would meet the assigned visual resource management class and contrast ratings requirements, as stated in BLM Manual Section 8423 and/or FS Manual 2380.
- Manmade objects in the natural landscape generally become focal points because of contrasting form, line, color, and texture. The project would be designed to complement its natural surroundings.
- The *National Forest Landscape Management Handbook* and general construction methods listed in the booklet entitled *Environmental Criteria for Electric Transmission Systems* would be utilized to minimize adverse aesthetic impacts.
- Rights-of-way through forest and timber areas would be established with curved undulating boundaries wherever possible.
- Trees would be topped and pruned, and existing small trees and plants would be

used to feather the right-of-way from grass and shrubbery to larger trees.

- Centerline selection would avoid skylining the tower structures if possible by staying away from hilltops and ridges.
- Location and design would take into consideration the topography and vegetation to reduce the visual impact.
- Nonspecular towers, hardware, and conductors would be utilized. Tower bases would be required to blend with the adjacent landscape.
- In areas with high visual sensitivity and low visual absorption capability, the participants would consider the use of alternative design structures to minimize visual intrusions.

Electrical Effects

- The applicant would comply with grounding and clearance requirements of the *National Electric Safety Code* and other applicable Federal bulletins.
- Project design would include spacings of 17-40 m (55-130 feet) between the conductors and the spray nozzles of irrigation systems if the line passed through an area irrigated by irrigation systems.
- The transmission line would be designed in accordance with the *National Electric Safety Code* and the Rural Electrification Administration's (REA) Bulletin 62-1.
- The line would be designed so that it does not contribute to less than Federal Communication Commission (FCC) satisfactory service under fair weather conditions for all residences 90 m (300 feet) or greater from the transmission line.
- Any television or radio interference problems attributed to the transmission line and other associated facilities of the project would be corrected to the extent reasonably possible.

OIL AND GAS PIPELINES

Certain of the following mitigation measures are also applicable to electrical transmission line projects. The resource(s) addressed by the mitigation measures are listed at the end of each measure.

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- Technical assistance and approval of written plans for BLM- and FS-administered lands would be obtained from the USDI, BLM and/or USDA, FS prior to any construction.
- Standard procedures for the proposed pipeline project(s) would include implementation of erosion control and revegetation measures to assure that lands disturbed by construction activities would be restored to a stable, productive, and aesthetically acceptable condition. (Soils, Geology, Freshwater and Terrestrial Biology, and Visual Resources)
- Detailed site-specific geotechnical, restoration, and reclamation plans would be developed and become part of the COM Plan. Because the proposed right-of-way would contain many types of terrain, soils, water, bedrock, vegetation, land uses, and climatic conditions, the detailed plan would include sets of techniques and measures tailored to each condition encountered. Local expertise and locally effective slope stabilization and reclamation methods would be followed when the site-specific procedures for the detailed plans were developed. Site-specific geotechnical and erosion control, revegetation, and restoration measures from the plans would be implemented under the direction of the appropriate agency official. (Soils, Geology, Freshwater and Terrestrial Biology)
- During construction of the project, an on-site reclamation specialist would be employed by the company(s) to provide: (1) liaison with BLM and FS officials; (2) expertise to direct applicable restoration procedures when special conditions are encountered, without causing construction delays; and (3) favorable public relations. (Soils, Terrestrial Biology)
- General erosion control and restoration measures are applicable to the following areas and would be included as part of the COM Plan. (Soils, Geology, Freshwater and Terrestrial Biology)
 - Right-of-Way and Site Clearings
 - Trenching and Preservation of Topsoil
 - Backfilling and Grading
 - Land Preparation and Cultivation
 - Revegetation
 - Maintenance and Monitoring
- Use of Biochemicals
- Land grading would be done only on the area required for construction. (Soils, Geology)
- Sidehill cuts would be kept to a minimum to ensure resource protection and a safe and stable plane for efficient equipment use. The land management agency would provide assistance and would approve sidehill cuts prior to construction. (Soils, Geology, Surface and Ground Water, Vegetation)
- Existing ground cover such as grasses, leaves, brush, and tree trimmings would be cleared and piled only to the extent necessary. Slash and limbs would be piled and later shredded and chipped for use in restoration operations or disposed of as directed by the land management agency. (Soils, Vegetation)
- Trees and shrubs on the right-of-way that are not cleared would be protected from damage during construction. (Vegetation)
- Where the right-of-way crosses streams and other water bodies, the banks would be stabilized to prevent erosion. Construction techniques would minimize damage to shorelines, recreational areas, and fish and wildlife habitat. (Soils, Surface Water, Freshwater Biology, Wildlife, Recreation Sites/Uses)
- Care would be taken to avoid oil spills and other types of pollution in all areas including streams and other water bodies and in their immediate drainage areas. All spills would be immediately cleaned up. (Freshwater and Terrestrial Biology)
- Design and construction of all temporary, reconstructed, and newly constructed roads would be based on an approved COM Plan transportation section and would ensure proper drainage, minimize soil erosion, and preserve topsoil. This plan would include clearing work, rehabilitation, and use and maintenance agreements associated with transportation needs. Where possible, the right-of-way itself would be used as an access road during the construction period. The FS requires that access roads paralleling this pipeline be closed and vegetative cover reestablished after pipeline construction is completed. No maintenance roads along the pipeline route would be permitted. Overland access could be specified in lieu

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of road construction or reconstruction. All temporary roads would be closed and areas restored without undue delay or maintained as specified in the right-of-way grant(s) or special use permit(s). Restoration to near original slope and contour, including redistribution of topsoil, would be to the satisfaction of the FS and BLM. (Soils, Surface Water, Socioeconomics-Traffic/Safety)

- During adverse weather conditions, as determined by the Authorized Officer, stop and start orders would be issued to prevent rutting or excessive tracking of soil and deterioration of vegetation in the right-of-way area. (Soils, Vegetation)
- During construction activities near streams or lakes, sedimentation (detention) basins and/or straw bale filters would be constructed to prevent suspended sediments from reaching downstream watercourses or lakes, as required by the land management agency. (Surface Water, Freshwater Biology)
- Actual construction activities would immediately follow clearing operations, especially in areas of soil that were highly susceptible to wind or water erosion and other special areas. (Soils)
- All topsoil would be conserved for reclamation requirements, unless otherwise directed by the land management agency; excess topsoil would be stockpiled at designated locations. Topsoil would be removed from the trench area by double-ditching (i.e., windrowed separately, protected, and replaced last during backfilling). (Soils)
- In trenching operations, remaining unearthed materials would be removed and stored in a manner that facilitates backfilling procedures, uses a minimum amount of right-of-way area, and protects the excavated material from vehicular and equipment traffic. (Soils)
- Cofferdams or other diversionary techniques would be used where necessary to permit flow in one part of a stream while pipe-laying construction occurred in another part. (Surface Water)
- A specific trenching and excavated material stockpiling procedure would be used on steep-sloping and broken terrain to insure minimum disturbance as outlined in the COM Plan. (Soils, Geology, Surface and Ground Water)
- Trench backfill would be replaced in a sequence and density similar to the pre-construction soil condition. (Soils, Geology, Ground Water)
- Trench backfilling operations would be conducted in a manner that would minimize further disturbance of vegetation. (Vegetation)
- The contour of the ground would be restored to permit normal surface drainage. (Soils, Geology, Surface Water)
- In strongly sloping and steep terrain, erosion control structures such as water bars, diversion channels, and terraces would be constructed to divert water away from the pipeline trench and reduce soil erosion along the right-of-way and other adjoining areas disturbed during construction. (Soils, Geology, Surface and Ground Water)
- The surface would be graded to conform to the existing surface of the adjoining areas except for an adequate crown over the trench to compensate for natural subsidence. (Soils)
- Topsoil would be uniformly replaced over the trench fill and other disturbed areas to restore productivity to its preconstruction condition. (Soils, Vegetation)
- Materials unsuitable for backfilling or excess backfill material would be disposed of as arranged by the land management agency. (Soils, Vegetation)
- Temporary work space areas used at stream and highway crossings and other special sites would be restored to approximate preconstruction conditions and to the satisfaction of the land management agency. (Surface Water, Freshwater Biology, Socioeconomics-Traffic/Safety)
- Chiseling would be used in rangeland areas to reduce compaction and improve soil permeability, unless objected to by the land management agency. Pitting and contour furrowing as directed by the FS would be done on steeper slopes of disturbed areas to increase infiltration and to reduce runoff and erosion. (Soils, Surface Water, Grazing)
- Suitable mulches and other soil-stabilizing practices would be used on all regraded and topsoiled areas to protect unvegetated soil from wind and water erosion and to improve water absorption. (Soils, Surface Water, Vegetation)

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- Rock mulches would be used in steep-sloping rock outcrop and low precipitation areas to reduce erosion and promote vegetal growth. (Soils, Vegetation)
- Cultivation and land preparation operations on steeply sloping areas would be done on the contour to minimize erosion. (Soils, Vegetation)
- Soil areas with rock fragments, such as very coarse gravel, cobble, or stone scattered on the surface, would be restored to the original preconstruction surface condition to blend with the adjoining area, to avoid a smooth surface right-of-way area, and to control accelerated erosion. (Soils, Visual Resources)
- The revegetation program, methods, and procedures would be consistent with local climate and soil conditions and would follow recommendations and directions of local experts. Revegetation efforts would be continued until a satisfactory vegetative cover was established. (Soils, Vegetation)
- Special mulching practices or matting would be necessary in critical areas where wind and water are serious erosion hazards to protect seeding, seedlings after germination, and plantings. (Soils, Vegetation)
- Commercial fertilizers would be applied to soil areas with low inherent fertility to establish grass seedings. Application rates would be commensurate with annual precipitation and available irrigation water. (Vegetation)
- Seedbeds for grass-seeded areas would be prepared to provide a firm and friable condition suitable for the establishment of grass stands. (Vegetation)
- A firm seedbed would be prepared prior to seeding. This would include a mulch of plant residues or other suitable materials. A cover crop could be needed in larger disturbed areas. (Vegetation)
- Seed would be planted by drilling, broadcasting, or hydroseeding. Drilling is the preferred method, because it is usually most successful. Drill seeding with a grass drill equipped with depth bands would be used where topography and soil conditions allow operation of equipment to meet the seeding requirements of the species being planted. Broadcast seeding would be used for inaccessible or small areas. Seed would be covered by raking or harrowing. Hydroseeding would be done in critical areas determined by the land management agency. (Vegetation)
- Only species adapted to local soil and climatic conditions would be used. Generally, these would be native species. However, introduced species could be considered for specific conditions when approved by the FS and/or BLM. Seeding rates in critical area plantings and generally throughout the right-of-way would be increased 100 percent over regular seeding rates to allow for seed mortality due to adverse growing conditions. (Vegetation)
- Seed testing would be conducted to meet State, Federal, and agency seed requirements. (Vegetation)
- Seeding would be done when seasonal or weather conditions were most favorable and as determined by the land management agency. (Vegetation)
- Grazing would be delayed for a period directed by the land management agency to provide time for vegetation to become established, especially in highly erodible areas. Procedures for excluding grazing within the right-of-way could involve protective fencing; removal of range animals from affected allotments, with compensation by the company(s) to range permittees; adjusting grazing use schedules within allotments; etc. In the case of protective fencing, fences would be constructed, maintained, and removed by the company(s) according to land management agency specifications. (Vegetation, Grazing)
- In areas of low annual precipitation (generally less than 8 to 10 inches), where reseeding is not suitable or as successful, erosion control structures and measures would be applied on sloping areas to: (1) reduce accelerated erosion; (2) allow reestablishment of preconstruction surface soil conditions; and (3) allow natural revegetation. (Soils, Vegetation)
- Indigenous trees and shrubs would be reestablished in areas as specified in the revegetation section of the COM Plan. As directed by the land management agency, temporary and/or permanent structures would be installed by the company(s) at specific locations along the right-of-way

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and other disturbed sites to prevent ORV access. (Soils, Vegetation, Recreation Use, Visual Resources)

- Joint inspection of the right-of-way by the company(s) and the land management agency would be conducted to monitor the success and maintenance of erosion control measures and revegetation programs on native grazing lands for two growing seasons, or for a period determined by the land management agency. The monitoring program would identify problem areas and corrective measures to insure vegetation cover and erosion control. Certification of successful revegetation and erosion control would be determined by the land management agency. (Soils, Vegetation, Grazing)
- The applicant(s) would conduct all activities associated with the project in a manner that would avoid or minimize degradation of air, land, and water quality. In the construction, operation, maintenance, and abandonment of the project, the applicant(s) would perform all activities in accordance with applicable air and water quality standards, related facility siting standards, and related plans of implementation including, but not limited to, the Clean Air Act, as amended (42 USC 1321). (Air Quality, Geology, Freshwater Biology, Terrestrial Biology)
- Engine oil changed on Federal lands would be contained in suitable containers and disposed as refuse. (Surface Water, Ground Water, Freshwater Biology, Terrestrial Biology)
- The land management agencies would require adherence to the latest State Oil and Hazardous Spills Plan/Directory. The applicant(s) would develop a hydrocarbon spill prevention, control, and countermeasures plan, following the guidelines established within the corresponding State Plan/Directory. This plan would address: (1) notification of appropriate agency personnel; (2) actions that would be taken to detect and stop spills; (3) methods of collection and removal of the spill; and (4) follow-up treatment of residual hydrocarbons in the environment. The plan would include state-of-the art techniques for containment and clean-up of appropriate size classes of discharges included in the governing State's Oil and Hazardous Spills Plan/Directory. The use, design, and deployment of the techniques would be specified by water courses and land use areas in the plan. Containment, removal, and disposal techniques would require prior approval and authorization of the land management agency. (Surface Water, Ground Water, Freshwater Biology, Terrestrial Biology)
- When providing access to the pipeline right-of-way, all rivers, streams, and washes would be crossed at existing roads or bridges; any other crossing must be approved and designated by the land management agencies. The applicant(s) would be required to install culverts or bridges at points where new permanent access roads would cross live streams to allow unobstructed fish passage. Where drainages would be crossed by temporary roads, dirt fills, or culverts would be placed and removed upon completion of the project. Any construction activity in a perennial stream would be prohibited unless specifically allowed by the land management agencies. All stream channels and washes would be returned to their natural state. Such construction, when it would occur on BLM- and FS-administered land, would be managed under the restrictions in the current agency manual and/or Department Policy direction. (Surface Water, Freshwater Biology)
- Vegetation cleared during construction would be disposed as directed by the land management agencies. Where commercial tree species are cut and a current market is available, the trees would be measured and paid for as directed by the land management agencies. (Vegetation, Land Ownership/Use)
- The applicant(s) would be required to control noxious weeds in areas where soil surface was modified or natural vegetation had been removed. Noxious weeds would be controlled in areas designated by agency officials. (Vegetation)
- Areas where access to the terrain or management constraints precluded standard construction methods would be identified in the COM Plan. If the terrain or management constraints warranted, the BLM and FS would direct the applicant(s) to use helicopters to string pipe, deliver equipment, or perform other phases of construction. (Soils, Geology, Surface Water, Ground Water)

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- Areas subject to mudflows, landslides, mudslides, avalanches, rock falls, and other types of mass movement would be avoided where practical in locating linear facilities. Where such avoidance was not practical, the design (based on detailed state-of-the-art geotechnical analysis) would include special measures to minimize the potential for mass movements to the satisfaction of the land management agencies. These measures would address, but not be limited to: (1) special ditch configurations; (2) special construction techniques; (3) slope stabilization systems such as dewatering lines, retaining structures, etc.; and (4) ground movement sensors. Existing soil and geological data would be gathered and used to achieve acceptable slope stabilization, revegetation, and soil erosion mitigation responses. (Soils, Geology, Surface Water, Ground Water)
- Clearing in timbered areas to reduce fire hazard for maintenance purposes would be limited to the working space right-of-way. (Vegetation, Visual Resources)
- The land management agencies would require preclearing of mountain brush and tree-covered areas prior to dozer or maintenance blade work. Preclearing would involve handwork or specialized equipment (i.e., mechanized shears, etc.) in cutting of brush and trees with removal by proper equipment to designated areas. (Soils, Vegetation)
- The re-establishment of vegetative cover as well as watershed stabilization measures would be scheduled during the ongoing working season prior to the succeeding winter season. The applicant(s) would follow this schedule as directed by the BLM and FS. If the agencies allowed final clean-up and revegetation to be delayed until the next construction season, the applicant(s) would take temporary measures to achieve short-term stabilization through the winter until final clean-up and revegetation activities could proceed.
- Temporary measures would be approved by the land management agencies and would include the following: (1) constructing temporary breakers at proper intervals on slopes and access roads to control runoff whenever applicable; (2) installing silt screens as silt barriers in swales, at the base of small slopes, and in other areas subject to sedimentation from low velocity runoff; (3) temporarily seeding critical areas such as road cuts and stream banks with an approved grass seed mixture; (4) mulching slopes; and (5) protecting drains with barriers. (Soils, Geology, Surface Water, Freshwater Biology, Terrestrial Biology)
- The land management agencies would direct the applicant(s) to control ORV use of the right-of-way. Such specified control could include use of physical barriers, replanting trees, or other reasonable means of vehicle control. (Soils, Surface Water, Vegetation, Visual Resources, Recreation Use)
- Construction equipment would not be refueled and maintained within stream channels; such activities would be done in areas designated by the land management agencies. (Surface Water, Freshwater Biology, Wildlife)
- The applicant(s) would meet all stipulations detailed in a Programmatic Memorandum of Agreement between the Advisory Council on Historic Preservation and the BLM and FS to fulfill all Federal and State cultural and paleontological resource legal requirements. (Archeology, American Indian Concerns, Paleontology)
- The applicant(s) would comply with applicable Federal and State laws and regulations concerning the use of pesticides (i.e., insecticides, herbicides, fungicides, rodenticides, and other similar substances) in all activities and operations. The applicant(s) would obtain approval of a plan from the BLM and FS prior to the use of such substances. The plan would provide the type and quantity of material to be used; the pest, insect, fungus, etc., to be controlled; the method of application; the location of storage and disposals of containers; and other information that the agencies might require. The plan would be submitted no later than December 1 of any calendar year that covers the proposed activities for the next fiscal year (i.e., December 1, 1986, deadline for a fiscal year 1988 action). If the need for emergency use of pesticides were identified, the use would be approved by the land management agencies. The use of substances on or near the right-of-ways and temporary permit areas would be in accordance with the approved plan. A pesti-

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cide would not be used if the Secretaries of the Interior and Agriculture have prohibited its use. A pesticide would be used only in accordance with its registered use and with other Secretarial limitations. Pesticides would not be permanently stored on BLM- and FS-administered lands. (Socioeconomics-Health/Safety)

- All existing improvements under Federal management or permit would be protected, and damage would be repaired immediately. (Land Ownership/Use)
- BLM and FS approval would be required for locating sites for equipment storage, pipeline storage, and staging areas on BLM- and FS-administered lands. A site preparation plan would be required for these sites. The site preparation plan would be part of the COM Plan. (Land Ownership/Use)
- All structures such as terraces, levees, underground drainage systems, irrigation pipelines, and canals would be restored to preconstruction conditions so that they would function as originally intended. (Land Ownership/Use)
- Gates on established roads on BLM- and FS-administered lands would not be locked or closed by the applicant(s). (Land Ownership/Use)
- Permittees and other regular users of BLM- and FS-administered lands affected by construction of the project(s) would be notified in advance of any construction activity that might affect their businesses or operations. This would include but not be limited to signing of temporary road closures, removal and/or cutting of fences, disturbances to range improvements, or

other range use-related structures. (Grazing, Land Ownership/Use)

- If a natural barrier used for livestock control were broken during construction, the applicant(s) would adequately fence the area to prevent drift of livestock. In pronghorn antelope ranges, the fence might have to be constructed to allow for animal passage. Fence specifications would be determined on a case-by-case basis. (Grazing)
- The applicant(s) would prepare a plan to minimize visual impacts from structures. If required by the land management agency, the applicant(s) would prepare photographic simulations of areas in which facilities are proposed within foreground-middle-ground acres of high scenic value or sensitivity. Using the simulation as a guide, the applicant(s) would design and locate the pipeline route and ancillary structures to blend into the existing environment. The land management agency would evaluate and approve measures before construction began. (Visual Resources)
- For the COM Plan, the land management agency would identify segments of pipeline right-of-way where vegetative clearing widths would be modified (i.e., feathered or undulated). This would be done to maintain the visual quality objectives of the respective BLM District and National Forest Management Plans. (Visual Resources)
- A fire control plan would be prepared by the applicant(s) and this plan would be made a part of the COM Plan.
- Garbage and refuse would be disposed of in an authorized disposal site or landfill. (Socioeconomics-Health)



APPENDIX F

SAMPLE FORM

APPROVAL FOR AMENDMENT OF COM PLAN

Amendment of any item or provision included in the COM Plan would require concurrence by parties to the plan and formal documentation. The following forms could be used to comply the documentation requirements. These forms could be

physically attached to the COM Plan or placed in a separate folder. An open index sheet should be prepared, showing amendment numbers and dates. This index sheet should be placed in front of all COM Plan copies.

APPENDIX F

APPROVAL FOR CHANGE ON CONSTRUCTION, OPERATION,
AND MAINTENANCE (COM) PLAN

DATE: _____

PROJECT NAME

COMPANY-ORGANIZATION

DOCUMENT NUMBER _____

THE FOLLOWING CHANGE OR DESIGN OR LOCATION HAS BEEN REQUESTED BY THE
HOLDER/PERMITTEE FOR THE ABOVE PROJECT _____

SPECIAL MITIGATION AND REQUIREMENTS _____

CHANGE APPROVED: _____
DATE

HOLDER REPRESENTATIVE

BLM/FS REPRESENTATIVE

ACCEPTANCE BY BLM/FS

The above request for change has been accomplished on _____ and has met
the special mitigation and other requirements as described above.

HOLDER REPRESENTATIVE

BLM/FS REPRESENTATIVE

DATE

DATE

APPENDIX G

SAMPLE ELECTRICAL

TRANSMISSION STRUCTURE DESIGNS

The following eight sketches and illustrations show typical electrical transmission

tower designs for 138 kilovolt (kV) and 345-kV, single circuit and double circuit transmission systems.

APPENDIX G

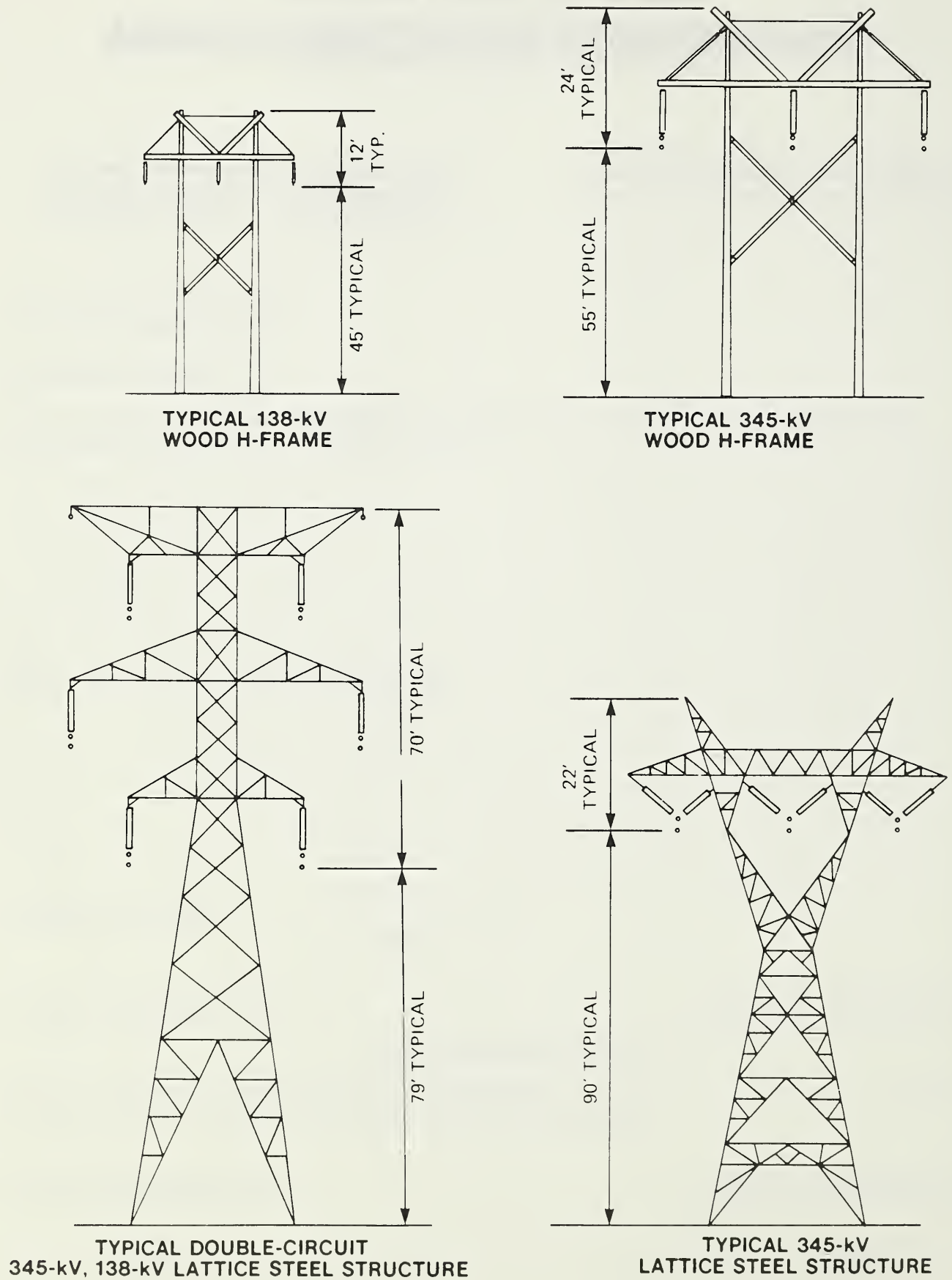


FIGURE G-1
Typical Tower Sketches

APPENDIX G

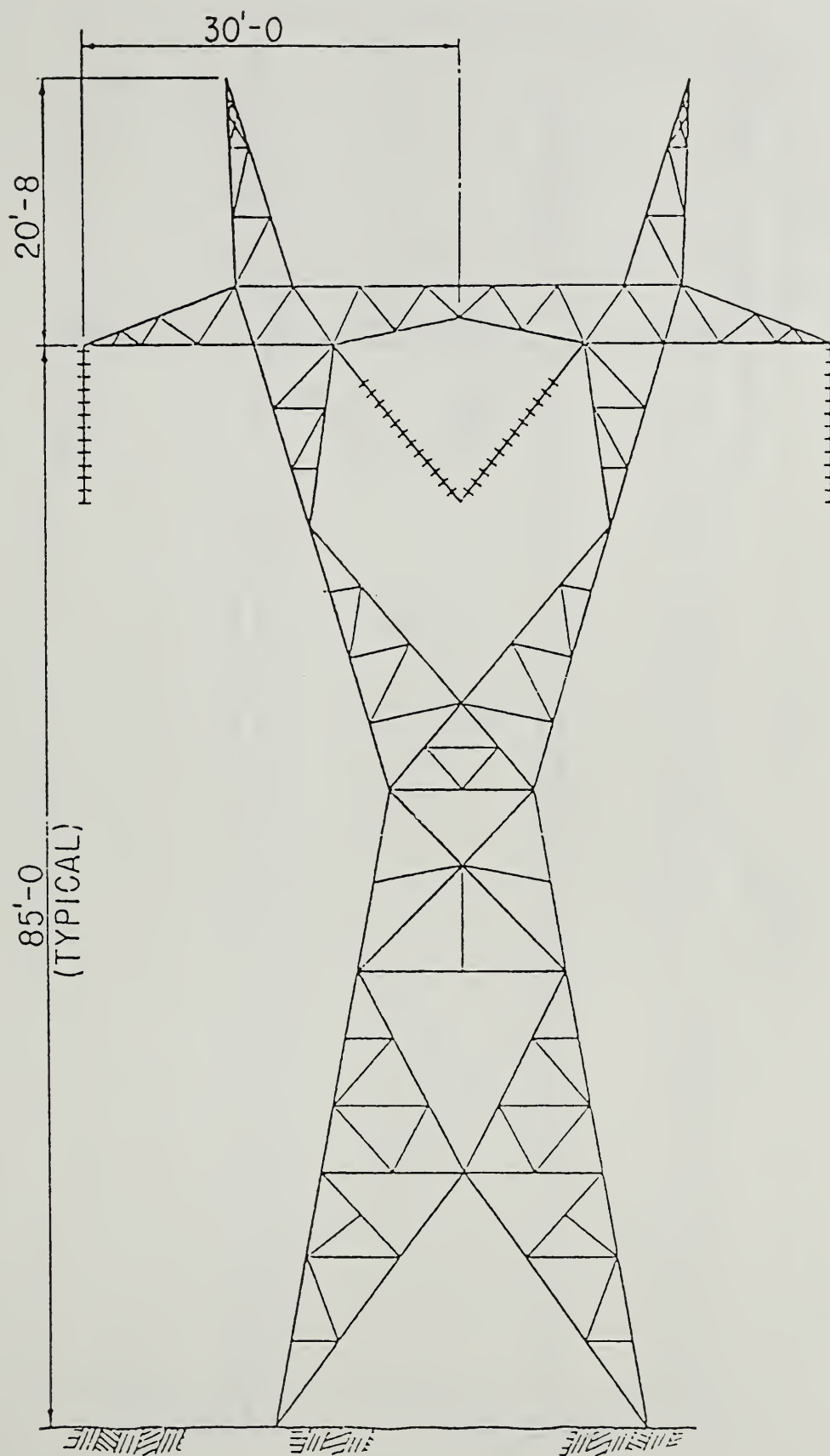


FIGURE G-2
Tangent Structure-Steel Lattice
345-KV Transmission Line

APPENDIX G

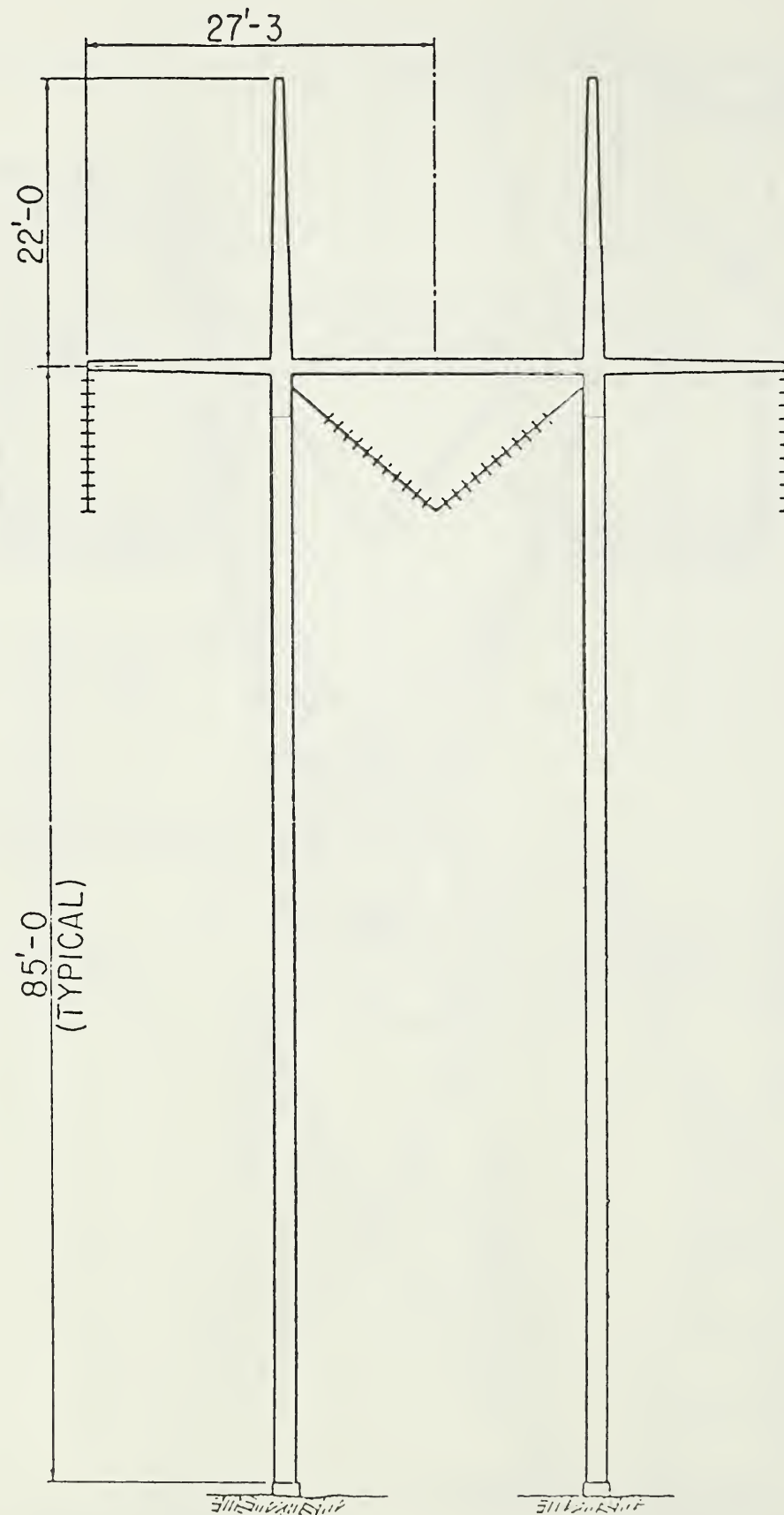


FIGURE G-3
Tangent Structure-Steel Pole
345-KV Transmission Line

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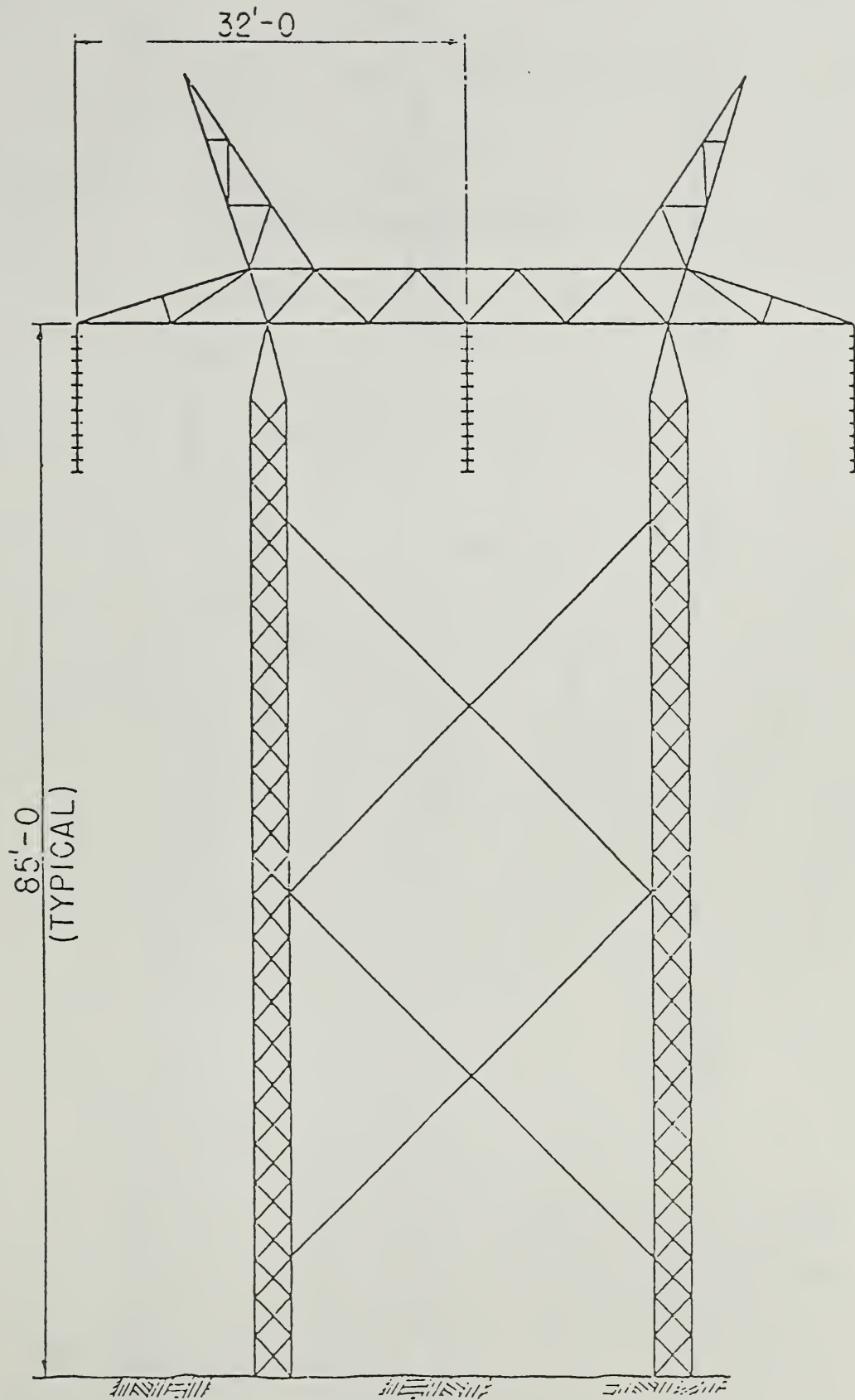
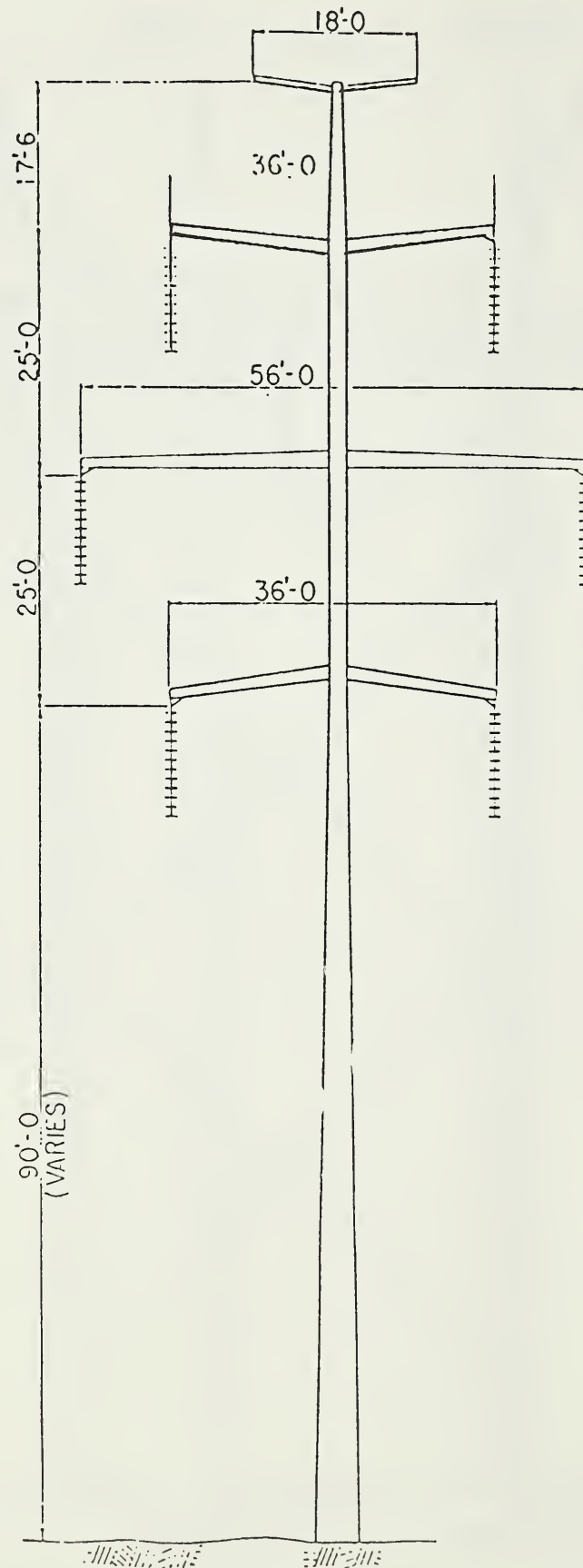


FIGURE G-4
Tangent Structure-Steel Lattice H-Frame
345-KV Transmission Line

APPENDIX G



TOTAL WIDTH 56 feet

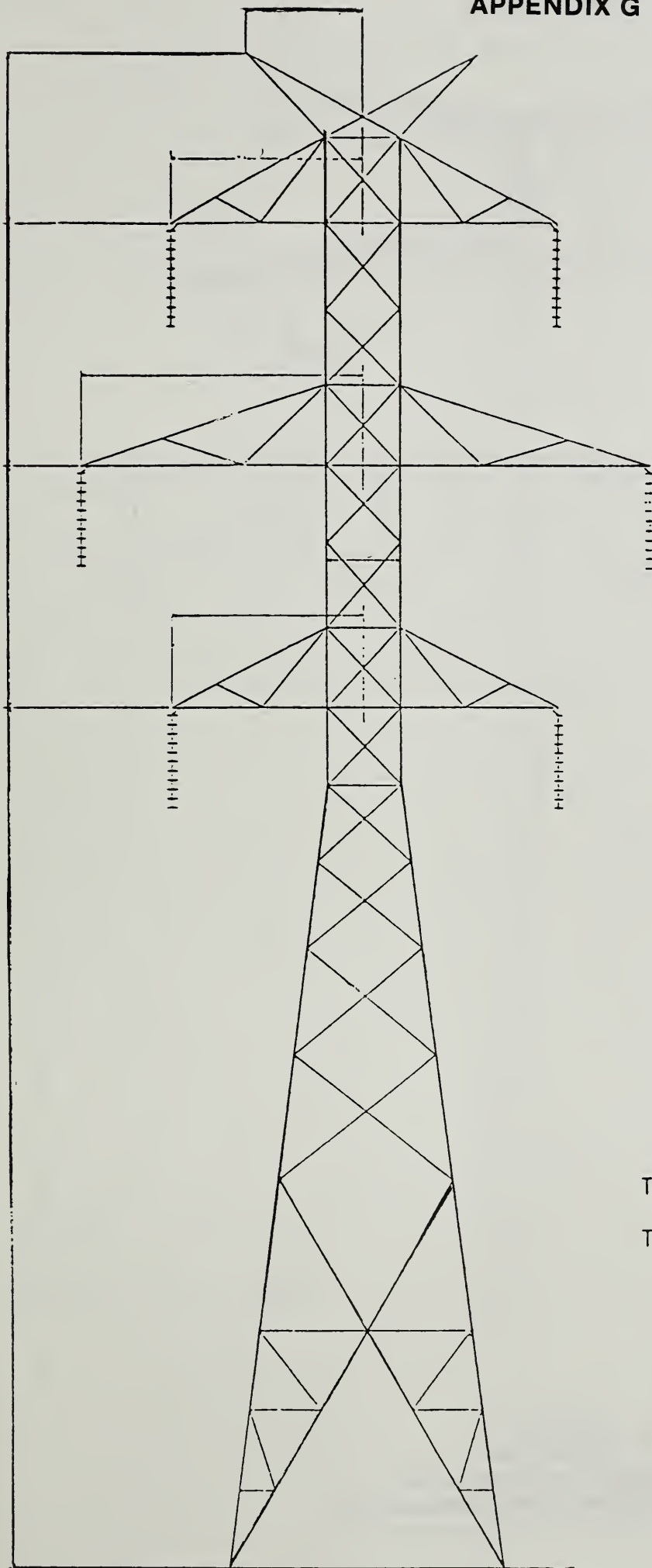
TOTAL HEIGHT 167 feet

DOUBLE CIRCUIT

FIGURE G-5

Tangent Structure-Steel Pole
345-KV Transmission Line

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TOTAL WIDTH 62 feet

TOTAL HEIGHT 159 feet

FIGURE G-6
Double Circuit
Tangent Structure-Steel Lattice
Hayden-Ault 345-KV Transmission Line

APPENDIX G

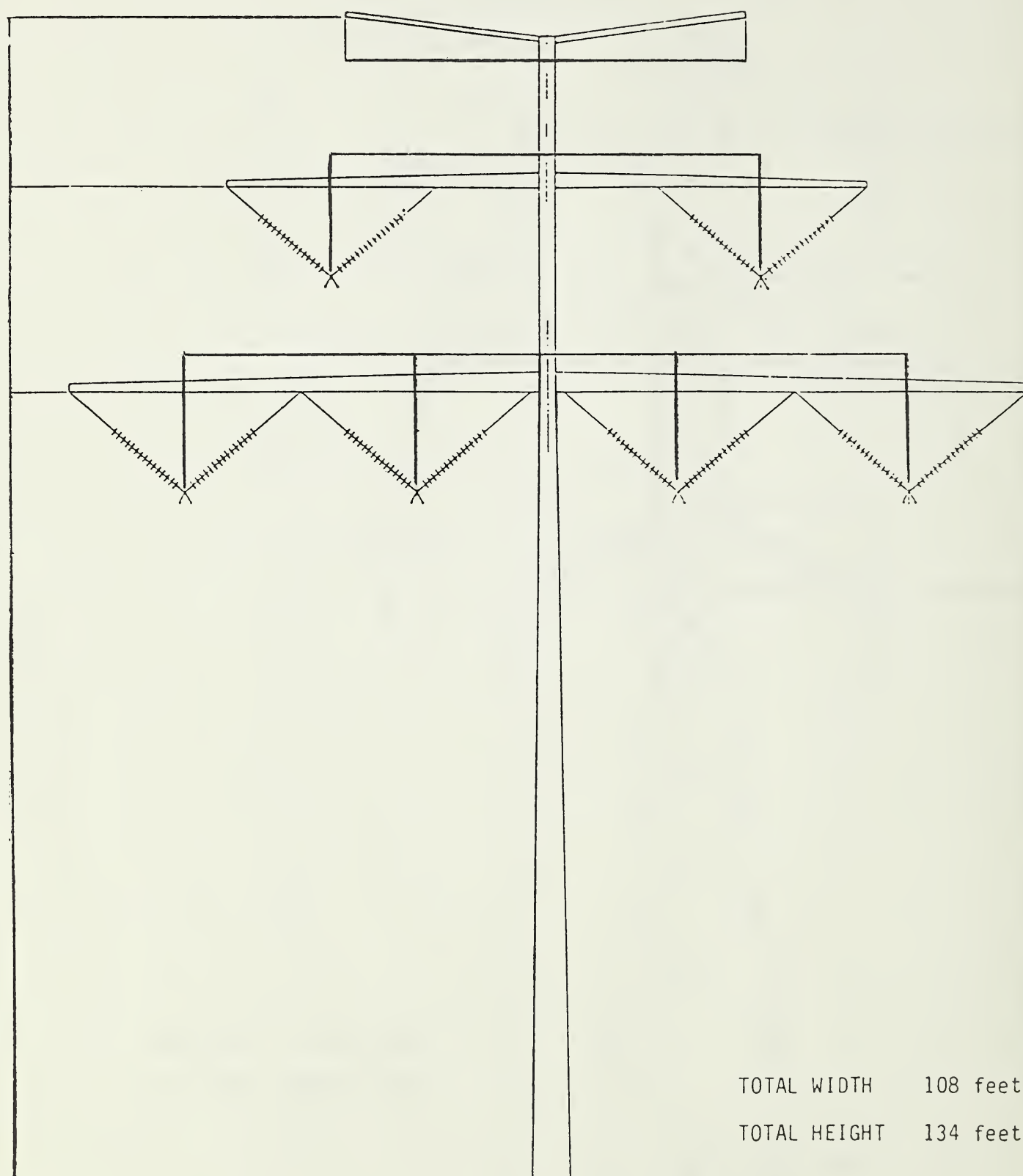
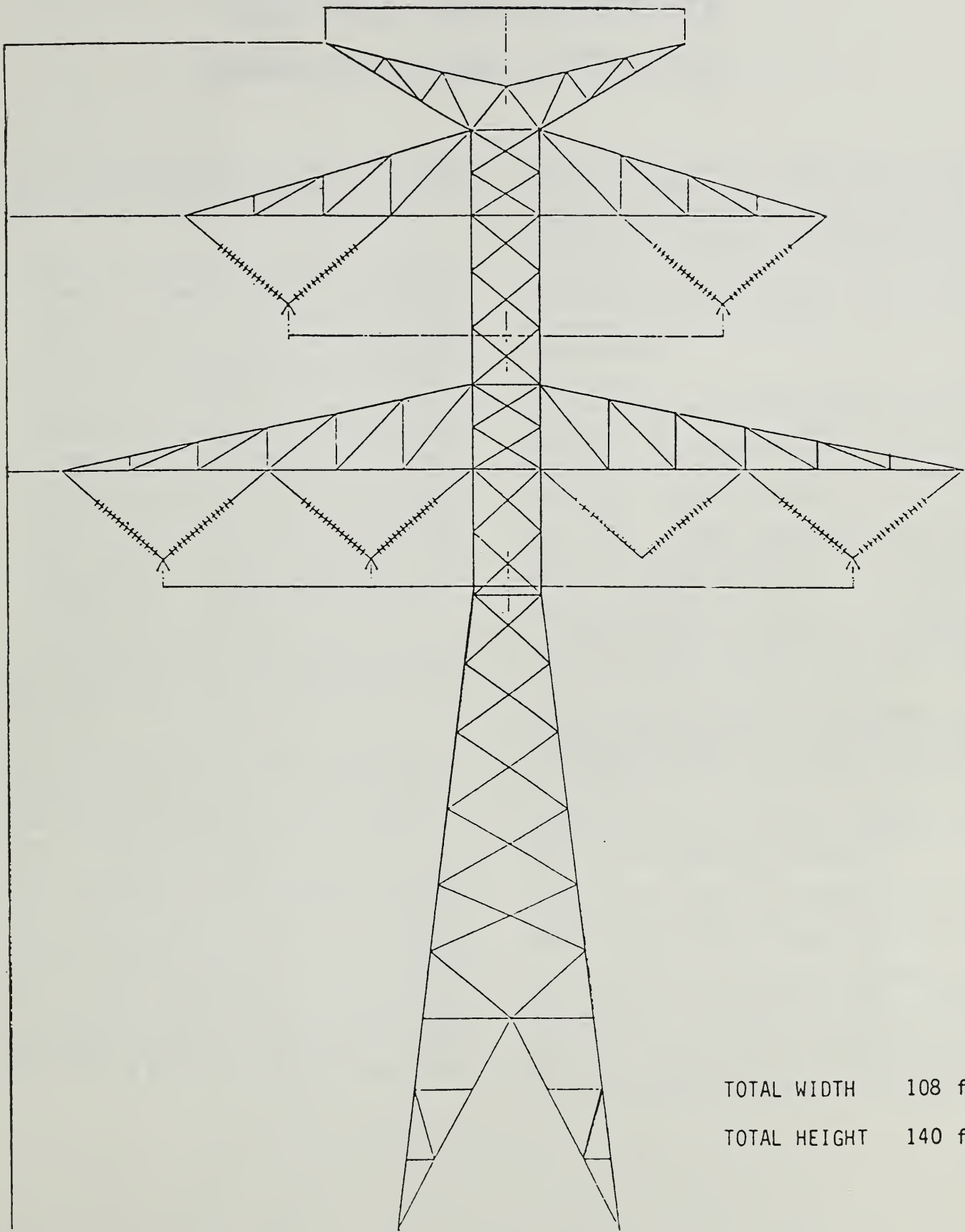


FIGURE G-7
Double Circuit
Tangent Structure-Steel Pole
Hayden-Ault 345-KV Transmission Line

APPENDIX G



TOTAL WIDTH 108 feet

TOTAL HEIGHT 140 feet

FIGURE G-8
Double Circuit
Tangent Structure-Steel Lattice
Hayden-Ault 345-KV Transmission Line



APPENDIX H

DULLING REQUIREMENTS (REDUCING REFLECTIVITY)

This is to quantify a general statement made in Agricultural Handbook No. 617, *Ski Areas*, Page 36 under the heading *Color of Structures*.

Based on the Munsell Neutral Value Scale, which is a standard scale of neutral grays placed in sequence between absolute black (0% reflectance) and absolute white (100% reflectance); galvanized steel and other shiny metals should be darkened to allow only 12% or less light reflectance to achieve the best blending with the natural landscape. Each project should be evaluated on an individual basis to allow for recognition of local conditions which may require different degrees of reflection. The recommended darkening of shiny metals falls into the medium to dark gray category of the (ISCC-NBS), Inter-Society Color Council-National Bureau of Standards, standard color names.

In addition, the colors used for painting facilities and structures usually should be dark earthtone colors like those shown on Page 37 of this handbook.

Dulling of the structural steel, hardware, and conductors should be a part of the design of a electrical transmission line. There are various types of dulling agents available on the market. Some of those compounds are Turcoatmicro zinctite, galvanprime, oakite cryscoat, lime coating, anodizing, and others. These compounds are used for structural steel that has been galvanized and is not used for dulling conductors. A different dulling process is used for conductors. In areas with trees, the darker the steel or wood, the better the structure will blend. An almost black structure in a tree environment will blend the best. Green-colored structures, unless they are very dark olive green, do not blend into a forest environment.

Black wooden poles blend very well in a forest setting. In open space, such as very large meadows and pinyon-juniper areas, a lighter gray structure blends better. A black structure becomes more predominant on the open flat landscape. Green wooden poles have the same effect as black poles and do not blend well in the open environment. Light natural wooden poles seem to blend the best.

Type and style of insulators should be identified, since some are very visible. The following is a description of various insulators used in the industry in regard to reflectivity. This description is only for reflectivity and does not address any electrical insulation properties.

Clear glass insulators, because of their transparency, present a larger field of reflection, which results in increased visibility.

Clear bowl-shaped insulators provide a large area of reflective surface, tend to magnify reflected light, and always present some area of their surface to any existing light source.

Surface irregularities, such as reinforcement ribs, tend to increase the reflective surfaces, which in turn increases visibility, especially on insulators of clear glass construction.

Opaque insulators, in dark colors, appear to be less reflective than those of clear glass construction under most lighting conditions.

Insulators with a dull nonreflective surface, if available and practical, would provide the least visual impact, under most lighting conditions.

Insulators made of ethylene propylene copolymer compound or similar material are more subdued visually because of their narrow profile, lack of bulk, and low reflective surfaces. The color of the skirts around the rods should be dark grey or black if possible. Blue skirts are not acceptable.

Introduction

The purpose of this study is to investigate the effects of various factors on the growth of a certain plant species. The study is divided into two main parts: a theoretical analysis and an experimental investigation.

Theoretical Analysis		Experimental Investigation	
Factor A	Factor B	Factor C	Factor D
1.0	2.0	3.0	4.0
2.0	3.0	4.0	5.0
3.0	4.0	5.0	6.0
4.0	5.0	6.0	7.0
5.0	6.0	7.0	8.0
6.0	7.0	8.0	9.0
7.0	8.0	9.0	10.0
8.0	9.0	10.0	11.0
9.0	10.0	11.0	12.0
10.0	11.0	12.0	13.0
11.0	12.0	13.0	14.0
12.0	13.0	14.0	15.0
13.0	14.0	15.0	16.0
14.0	15.0	16.0	17.0
15.0	16.0	17.0	18.0
16.0	17.0	18.0	19.0
17.0	18.0	19.0	20.0
18.0	19.0	20.0	21.0
19.0	20.0	21.0	22.0
20.0	21.0	22.0	23.0
21.0	22.0	23.0	24.0
22.0	23.0	24.0	25.0
23.0	24.0	25.0	26.0
24.0	25.0	26.0	27.0
25.0	26.0	27.0	28.0
26.0	27.0	28.0	29.0
27.0	28.0	29.0	30.0
28.0	29.0	30.0	31.0
29.0	30.0	31.0	32.0
30.0	31.0	32.0	33.0
31.0	32.0	33.0	34.0
32.0	33.0	34.0	35.0
33.0	34.0	35.0	36.0
34.0	35.0	36.0	37.0
35.0	36.0	37.0	38.0
36.0	37.0	38.0	39.0
37.0	38.0	39.0	40.0
38.0	39.0	40.0	41.0
39.0	40.0	41.0	42.0
40.0	41.0	42.0	43.0
41.0	42.0	43.0	44.0
42.0	43.0	44.0	45.0
43.0	44.0	45.0	46.0
44.0	45.0	46.0	47.0
45.0	46.0	47.0	48.0
46.0	47.0	48.0	49.0
47.0	48.0	49.0	50.0
48.0	49.0	50.0	51.0
49.0	50.0	51.0	52.0
50.0	51.0	52.0	53.0
51.0	52.0	53.0	54.0
52.0	53.0	54.0	55.0
53.0	54.0	55.0	56.0
54.0	55.0	56.0	57.0
55.0	56.0	57.0	58.0
56.0	57.0	58.0	59.0
57.0	58.0	59.0	60.0
58.0	59.0	60.0	61.0
59.0	60.0	61.0	62.0
60.0	61.0	62.0	63.0
61.0	62.0	63.0	64.0
62.0	63.0	64.0	65.0
63.0	64.0	65.0	66.0
64.0	65.0	66.0	67.0
65.0	66.0	67.0	68.0
66.0	67.0	68.0	69.0
67.0	68.0	69.0	70.0
68.0	69.0	70.0	71.0
69.0	70.0	71.0	72.0
70.0	71.0	72.0	73.0
71.0	72.0	73.0	74.0
72.0	73.0	74.0	75.0
73.0	74.0	75.0	76.0
74.0	75.0	76.0	77.0
75.0	76.0	77.0	78.0
76.0	77.0	78.0	79.0
77.0	78.0	79.0	80.0
78.0	79.0	80.0	81.0
79.0	80.0	81.0	82.0
80.0	81.0	82.0	83.0
81.0	82.0	83.0	84.0
82.0	83.0	84.0	85.0
83.0	84.0	85.0	86.0
84.0	85.0	86.0	87.0
85.0	86.0	87.0	88.0
86.0	87.0	88.0	89.0
87.0	88.0	89.0	90.0
88.0	89.0	90.0	91.0
89.0	90.0	91.0	92.0
90.0	91.0	92.0	93.0
91.0	92.0	93.0	94.0
92.0	93.0	94.0	95.0
93.0	94.0	95.0	96.0
94.0	95.0	96.0	97.0
95.0	96.0	97.0	98.0
96.0	97.0	98.0	99.0
97.0	98.0	99.0	100.0

APPENDIX I

SAMPLE CUTTING GUIDE

FOR TOPPING OR REMOVAL OF TREES

Selective topping is removing a portion of the tree crown that would interfere with the safety of the conductor. Most tree species in the region will survive by removing 50 to 60 percent of the crown. The tree develops a brush-like top from various leaders sent out by the tree. Some sun scalding could occur on the tree, and insect infestation could increase.

Selective removal is removing select trees near, under, and around the structures, conductor, corridor, and right-of-way. These trees are either too large to top or do not lend themselves to topping. Selective removal can be used in combination with selective topping.

Patch cutting is removing groups of trees to either reduce the danger of the conductor hitting the trees or to help in blending of the vegetative treatment of the corridor or right-of-way.

To assist in determining what trees or groups of trees should be topped or removed, a computer-designed tree-cutting guide has been developed. A sample is found on the following page. The purpose of the tree-cutting guide is to accurately determine what tree or trees need to be topped or removed. The main body of the tree-cutting guide shows what height the tree cannot exceed. This is based on height of the conductor, distance from the conductor, and percent of slope. Also, a clearance safety factor is designed in the guide.

To blend the transmission line or pipeline into the landscape, the vegetative patterns that exist must be identified and mapped on an aerial photo (with a 1-inch to 200-foot scale). Repeating the natural vegetative patterns when topping, patch cutting, or selective removal will achieve the visual management objectives of blending the transmission line and the right-of-way into the landscape.

To accomplish this blending, 100-foot stationing should be done between the points of intersect (PIs) in timber areas. Without the 100-foot stationing it is impossible to design, mark, or cut the trees, because you cannot tell where you are located in reference to the PIs.

The Construction, Operation, and Maintenance (COM) Plan should identify skid trails, log decks, wood-chipping areas, slash burning, lop and scatter areas and firewood decks. In sensitive areas (e.g., areas with high erosion potential or sensitive visual impact areas) consideration should be made to require equipment for skidding logs to have only a PSI (lbs/sq.in.) load of nine when loaded.

If chipping of slash is used, the chips left on the ground should not be deeper than 3 inches, and the green chips should be fertilized to prevent soil denitrification. Nitrogen fertilizer should be applied at the rate of 200 lbs. of available nitrogen per acre. This could vary depending on soil conditions, nearness to streams, and type of vegetation.

APPENDIX I

APPENDIX I Cutting Guide for Topping and Removal of Trees (For Transmission Right-of-Way)

Slope = 0 Percent

CONDUCTOR HEIGHT FROM GROUND	UP SLOPE FROM CONDUCTOR										TREE DISTANCE FROM NEAREST CONDUCTOR (FEET)													
	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125
17	9	12	16	20	24	28	33	38	42	47	52	57	62	66	71	76	81	86	91	96	101	106	111	116
20	12	14	18	22	26	30	34	39	43	48	53	58	62	67	72	77	82	87	91	96	101	106	111	116
23	13	17	20	23	27	31	36	40	45	49	54	58	63	68	73	78	82	87	92	97	102	107	112	117
26	17	20	22	26	29	33	37	41	46	50	55	60	64	69	74	78	83	88	93	98	103	107	112	117
29	20	22	25	28	31	35	39	43	47	52	56	61	65	70	75	79	84	89	94	98	103	108	113	118
32	23	25	27	30	33	37	41	45	49	53	57	62	66	71	76	80	85	90	94	99	104	109	114	119
35	26	28	30	33	36	39	43	47	51	55	59	63	68	72	77	81	86	91	95	100	105	110	114	119
38	29	30	32	35	38	41	45	48	52	56	61	65	69	74	78	83	87	92	96	101	106	111	115	120
41	32	33	35	38	40	43	47	50	54	58	62	66	71	75	79	84	88	93	98	102	107	112	116	121
44	35	36	38	40	43	46	49	52	56	60	64	68	72	76	81	85	90	94	99	103	108	113	117	122
47	38	39	41	43	45	48	51	55	58	62	66	70	74	78	82	87	91	95	100	105	109	114	118	123
50	40	42	43	45	48	51	54	57	60	64	68	72	76	80	84	88	92	97	101	106	110	115	119	124
53	43	45	46	48	50	53	56	59	62	66	70	73	77	81	85	90	94	98	103	107	112	116	121	125
56	46	47	49	51	53	56	58	61	65	68	72	75	79	83	87	91	95	100	104	108	113	117	122	126
59	49	50	52	54	56	58	61	64	67	70	74	77	81	85	89	93	97	101	106	110	114	119	123	128
62	52	53	55	56	58	61	63	66	69	72	76	79	83	87	91	95	99	103	107	111	116	120	125	129
65	55	56	58	59	61	63	66	69	72	75	78	81	85	89	93	97	101	105	109	113	117	122	126	130
68	58	59	60	62	64	66	68	71	74	77	80	84	87	91	94	98	102	106	110	115	119	123	127	132
71	61	62	63	65	67	69	71	74	76	79	82	86	89	93	96	100	104	108	112	116	120	125	129	133
74	64	65	66	68	69	71	74	76	79	82	85	88	91	95	98	102	106	110	114	118	122	126	130	135
77	67	68	69	70	72	74	76	79	81	84	87	90	94	97	101	104	108	112	116	120	124	128	132	136
80	70	71	72	73	75	77	79	81	84	87	89	93	96	99	103	106	110	114	118	122	126	130	134	138
83	73	74	75	76	78	80	82	84	86	89	92	95	98	101	105	108	112	116	119	123	127	131	135	140
86	76	77	78	79	81	82	84	87	89	92	94	97	100	104	107	110	114	118	121	125	129	133	137	141
89	79	80	81	82	83	85	87	89	92	94	97	100	103	106	109	113	116	120	123	127	131	135	139	143
92	82	83	84	85	86	88	90	92	94	97	99	102	105	108	111	115	118	122	125	129	133	137	141	145
95	85	86	87	88	89	91	93	95	97	99	102	105	108	111	114	117	120	124	127	131	135	139	143	147
98	88	89	90	91	92	94	95	97	100	102	104	107	110	113	116	119	123	126	130	133	137	141	144	148

APPENDIX J

SAMPLE FORM

FOR ACCESS ROAD SUMMARY

The following form could be used to show construction requirements for various roads by stationing.

Line _____ Segment _____ Map Symbol _____ Prepared by _____ Date _____

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LIST OF ABBREVIATIONS

ACHP: Advisory Council on Historic Preservation	nm: millimeter
BLM: Bureau of Land Management	NEPA: National Environmental Policy Act
CFR: Code of Federal Regulations	ORV: off-road vehicles
COM: Construction, Operation, and Maintenance	PI: points of intersect
DBH: Diameter breast height	psi: pounds per square inch
EA: Environmental Assessment	REA: Rural Electrification Administration
EIS: Environmental Impact Statement	ROD: Record of Decision
FAA: Federal Aviation Administration	SHPO: State Historic Preservation Officer
FCC: Federal Communication Commission	T&E: threatened and endangered
FLPMA: Federal Land Policy and Management Act	UDWR: Utah Division of Wildlife Resources
FS: Forest Service	USDA: United States Department of Agriculture
lb: pound	USDI: United States Department of the Interior
m: meter	USFWS: United States Fish and Wildlife Service
	USGS: United States Geological Survey
	VAC: Visual Absorption Capability



GLOSSARY

ASSEMBLY SITES: The site for the assembly of tower structures. Normally, earth disturbance is not necessary. Some tree removal might be required; however, the crane pad area should be used where possible. The size of the individual assembly sites will vary from 30' X by 60' to 150' X 200', depending on the size of the tower. If the towers are assembled in central locations, area requirements would be about 10 to 15 acres, depending on terrain and vegetation restraints. The distance between central assembly areas would be about 10 miles.

BLOCK VALVE: A valve which can be closed to isolate one section of pipe from the adjacent section.

CATHODIC PROTECTION: Anticorrosion technique for metal installations (pipelines, tanks, buildings) in which weak electric currents are set up to offset the current associated with metal corrosion.

CHISELING: The loosening of soil without inversion and with a minimum of mixing of the surface soil in order to shatter restrictive layers (below normal plow depth) that could inhibit water movement or root development (called chiseling when the restrictive layers are less than 16 inches deep).

CLIPPING: The process of securing a conductor to an insulator. Generally, the securing is by bolting the conductor to the insulator with a clamp.

CONCRETE BATCH PLANTS: Areas used to set up mixing plants, space for sand and gravel, space for concrete trucks, helicopters, water trucks, and personnel cars. The space requirement varies; however, about 5 to 10 acres is usually needed. For a 345-kV transmission line using free-standing lattice towers, concrete batch plants along the line would be needed.

COUNTER POISE: A system of conductors placed in the earth that are designed to protect a transmission line from the effects of lightning with a minimum of damage or interruption to the operation.

CRANE PADS: Spacing requirements depend on the type of structure and the type of equipment used. However, the cranes normally require a 30-by 60-foot level area. If wood pole structures are used, the space requirement for the crane is not as large. Usually about a 15' X 40' level area is needed.

DOUBLE-DITCHING: The practice of separating the topsoil from the subsoil during trench excavation.

DOUBLE-JOINTING YARD: An assembly area where two sections of pipe are welded together and coated.

HYDROSTATIC TESTING: Filling a pipeline or tank with water under pressure to test tensile strength.

PIPELINE WELDING: Bringing bevelled ends of two joints together and aligning them with line-up clamps. Qualified welders, under strict quality control conditions, join two sections of pipe using courses of weld-metal called beads in a series of passes designated as: (1) stringer bead; (2) hot pass; (3) third pass or hot fill (for heavy-wall pipe); (4) filler pass; and (5) final or capping pass.

PULL SITE AREAS: Where equipment is set up to pull or string the conductor onto the structures by means of pullys hung on the insulator from the tower. Space requirements for pull sites vary but normally require a 40' X 130' space. This space should be fairly level and cleared of trees and high-growing brush. Stripping the site of all vegetation is not necessary nor should this be allowed. Distance between pulls also varies, ranging up to 32,000 feet. However, the normal distance between pulls is from 5,000 to 7,000 feet. Good road access is needed to each designated pull site. Pull sites should be located as close to the transmission line as possible. This reduces the impact of clearing patches and extra road building.

SLASH: Debris resulting from cutting of woody vegetation (i.e., limbs, branches, roots).

SPREAD: A team of construction personnel and equipment required to construct an identified segment of pipe.

STOCKPILING: Storage of a resource item for later replacement and use.

STORAGE AREAS: This is needed for storage of conductor reels, steel for the towers, insulators, pipe if on a pipeline job, and equipment. The size and number of storage areas will depend on the length of the transmission line or pipeline.

STRUCTURE SITES: Show location, number of structures, and type of excavation that will be done (auger, backhoe, hand dig, other).

WATER BAR: Barriers usually constructed of soil used to divert water off slopes and/or roads.

